

STUDIES IN THE TAXONOMY AND DISTRIBUTION OF
THE EASTERN NORTH AMERICAN SPECIES
OF LOBELIA

ROGERS McVAUGH

(Continued from page 298)

9. *L. SPICATA* Lamarck, Dict. Bot. III: 587. 1789. This is a species with at least five well-defined phases, which may be distinguished as follows:

a) Var. *LEPTOSTACHYS* (A. DeCandolle) Mackenzie & Bush, Fl. Jackson County, Mo. 183. 1902.—TYPE LOCALITY: "in Carolina merid." TYPE SPECIMEN: The plant described by DeCandolle as *L. leptostachys* was seen by him in the herbarium of Asa Gray, collected by Fraser. This has not been seen, but there is in the New York

Botanical Garden a specimen collected at Lincolnton, N. C., by the Rev. M. A. Curtis, which was verified by Asa Gray, and is also marked "*Lob. leptostachys* A.DC. Genève 1839."—*L. leptostachys* A. DeCandolle, Prodr. Syst. Veg. VII: 376. 1839. *L. bracteata* Small, Fl. S.E.U.S. 1146. 1903.—Stem strict, unbranched, 30–120 cm. high, dark purplish-red and densely short-pubescent near the base, becoming smooth and light green above; often pubescent on the angles formed below the decurrent leaf-bases. Cauline leaves 10–40, usually quite close together and somewhat appressed to the stem, thus giving them an imbricated appearance in dried material; firm or leathery in texture; sessile, or the lowest narrowed to short petioles; the lower and middle ones obtuse, long-oblong or oblanceolate, to 2.5 × 12 cm., appearing sub-entire, but beset with callose-glandular teeth along the margins. Upper leaves gradually smaller, becoming definitely bract-like (lance-acute), and merging into the bracts of the inflorescence. Basal leaves usually few or none; if present, oblanceolate, obtuse. All leaves strigose-pubescent above and below, especially the lower

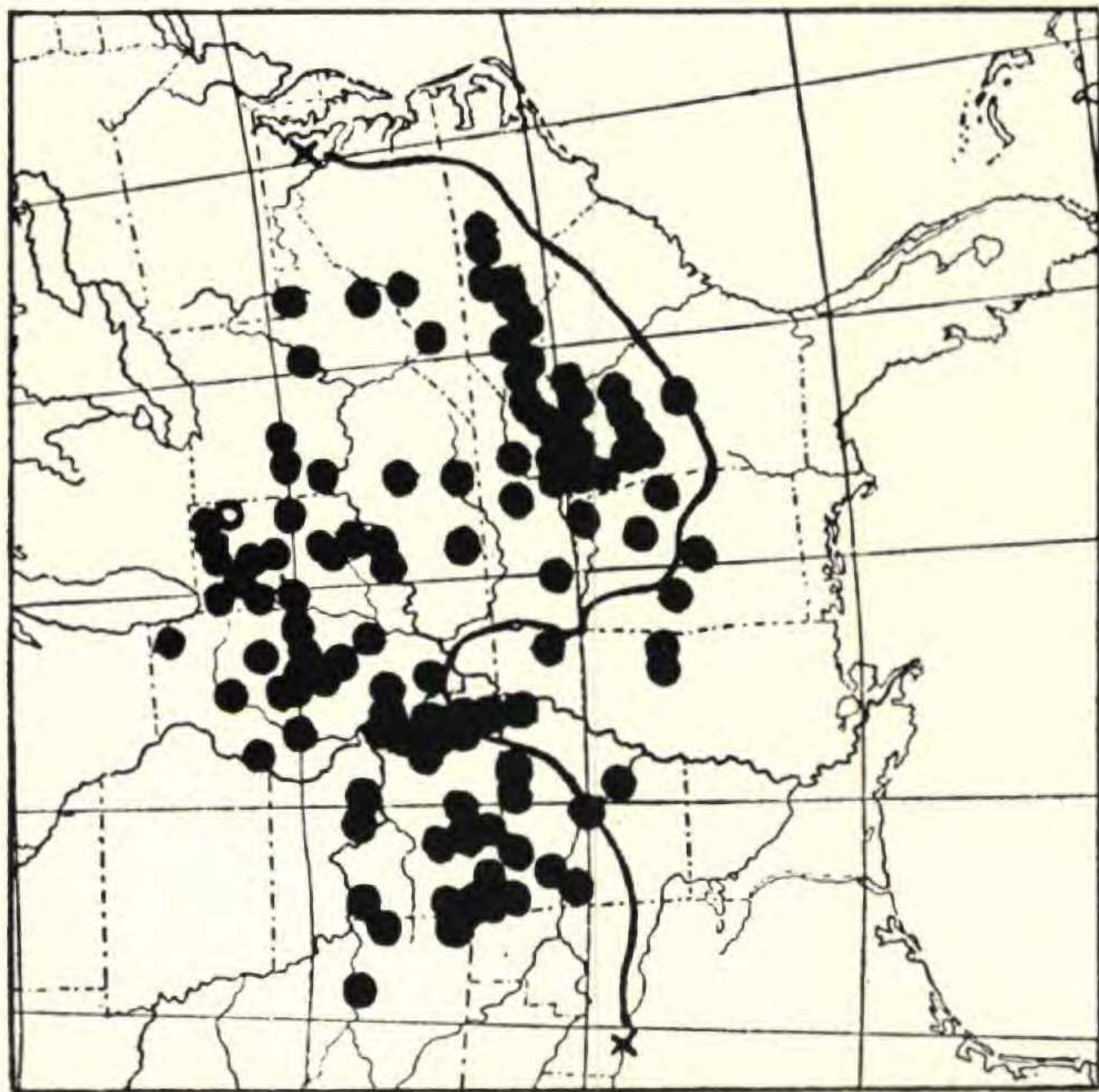


FIG. 14. Range of *LOBELIA SPICATA*, var. *LEPTOSTACHYS*.

leaves and near the margins. Plants, when dried, often with a characteristic brownish-green color. Inflorescence a terminal virgate spike 20–30 (50) cm. long, densely flowered, not noticeably secund, bearing 20–200 (ave. 30–60) flowers upon very short (in fruit 2–4 mm.) rough-puberulent curved pedicels, each with a pair of inconspicuous bracteoles near the base. Flower-bracts ciliate-pubescent or sometimes smooth, lanceolate, acute, sometimes linear-lanceolate, usually conspicuous, 1–4 cm. long. Calyx in anthesis flattish or conic, smooth or pubescent, becoming hemispheric in fruit, strongly ribbed, about 3.5 mm. in diameter. Capsule $\frac{1}{2}$ – $\frac{2}{3}$ inferior. Calyx-lobes subulate or linear-lanceolate, (2) 3–6 (7) mm. long, bristly-ciliate especially near the tips, or smooth; auricles at the base of each lobe filiform, 1–3 (5) mm. long, deflexed. Flower 9–12 mm. long, including calyx. Corolla light blue, smooth or pubescent outside, the lower lip pubescent at the base inside. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip ovate, not sharply reflexed, slightly shorter than the tube; two upper lobes lanceolate, curved upward. Filament-tube 3.0–3.5 mm. long, pubescent below, connate above about half its length. Anther-tube 1.8–2.0 mm. long, light bluish-gray, the two smaller anthers each with a tuft of white hairs at the tip, the three larger usually pubescent on the backs.

While this plant in its most characteristic state seems wholly distinct from var. *originalis* and var. *hirtella*, it is separated from them by no constant characters, and where the ranges of any of the three overlap, puzzling intermediates are frequently encountered. "Typical" var. *leptostachys* differs from var. *originalis* by the longer auricles, shorter pedicels (and consequently narrower spikes), somewhat longer, denser inflorescences, longer bracts, leaves thicker, longer, more numerous, more nearly entire, more appressed; somewhat heavier pubescence. It differs by similar characters from the pubescent var. *hirtella*. However, many specimens from Illinois, Missouri, Iowa, can be referred to no one of the three; all the distinguishing characters break down. In consequence, it seems best to consider all three as varieties of the same species (See FIG. 19).

Dry sandy woods and hillsides, northern West Virginia to central Alabama, west to northern Illinois, eastern Kansas and western Arkansas. Rare or absent on the eastern Coastal Plain; occasional on the Gulf Coastal Plain in Alabama, Mississippi, Arkansas and western Tennessee. Flower June 20–August 1. Representative Material seen: VIRGINIA: MONTGOMERY: *Leidy*, Jy. 1867 (ANS, UP). SMYTH: Chilhowie, *Small*, Aug. 1892 (NB). WEST VIRGINIA: GREENBRIER: Lewisburg, *Gray* 282 (CM). MONONGALIA: "Morgantown, Va.," *Dr. Paddock*, Short herb. (W). WOOD: Leachtown, *Millsbaugh* 304 (NB, WVa). NORTH CAROLINA: BUNCOMBE: Biltmore, *Biltmore herb.* 625b (G, M, Mo, NB, UP, US, W). CALDWELL: Hudson, *Randolph* 1131 (G). CHEROKEE: Andrews, *Huger*, Sep. 1900 (NB). DURHAM: Durham, *Blomquist* 5023 (Duke). FORSYTH: Winston-

Salem, *Schallert*, Jy. 1911 (Duke). HAYWOOD: *Ashe*, Sep. 1893 (NC). IREDELL: Statesville, *Hyams* (M). LINCOLN: Lincolnton, *Curtis* (ANS, NB). ORANGE: Hillsborough, *M. A. Curtis* ? (G). POLK: Columbus, *Townsend*, Oct. 1897 (US). ROWAN: Salisbury, *Heller 108*, Jun. 28, 1890 (ANS, Mo, NB). SWAIN: Great Smoky Mts., *Hemingway*, Aug. 1891 (WVa). SOUTH CAROLINA: PICKENS: nr. Clemson College, *House 2957* (US). GEORGIA: BALDWIN: "Georgia, *Dr. Boykin*," Torrey herb. (NB). CLARKE: Princeton, *Miller and Maguire 1489* (CU). CLAYTON: dry woods, *Harper 230* (G, Mo, US). COBB: *Wilson 33* (G, Mo, US). DEKALB: Stone Mt., *Eggert*, Jy. 1897 (Mo). FANNIN: Blue Ridge Mts., *H. H. Smith 2533* (W). FLOYD: W. Rome, *Pennell 4079* (UP, NB). GWINNETT: McGuire's Mill, *Small*, Jy. 1893 (Mo, US). HABERSHAM: Clarkesville, *J. D. Smith*, Sep. 1883 (G, US). WALKER: Lookout Mt. (no Co. given), *Ruth*, Jy. 1898 (Mo, NB, US). ALABAMA: AUTAUGA: Prattville, *Mohr*, Jy. 1880 (US). BLOUNT: *Mohr*, Jun. 1883 (US). CLAY: Millerville, *Pollard and Maxon 169* (NB). JACKSON: Scottsboro, *Earle*, Jun. 1899 (NB). TALLADEGA: Riddell's Mill, *Mohr* (US). TUSCALOOSA: Tuscaloosa, *Mohr*, Oct. 1879 (US). MISSISSIPPI: LOWNDES: Mayhew, *Donald*, Jun. 1927 (W). OKTIBBEHA: Starkville, *Phares*, ann. 1883 (Miss). KENTUCKY: FAYETTE: Lexington, *C. W. Short*, ann. 1836 (NB). PULASKI: Burnside, *Pennell 13795* (ANS). WARREN: Bowling Green, *Price*, Jun. 1897 (Mo). TENNESSEE: BRADLEY: Cleveland, *Leeds*, Jun. 1929 (ANS). CHESTER: Henderson, *Bain 214* (NB). COFFEE: Tullahoma, *Gattinger*, Jy. 1880 (Del). CUMBERLAND: Daysville, *Anderson 1401* (G). HAMILTON: Lookout Mt., *Vasey*, ann. 1878 (ANS, US). KNOX: Knoxville, *Ruth*, Jy. 1895 (ANS, M. W). OHIO: CLARK: Springfield, *Williams* (Mo). HAMILTON: Cincinnati, *Lea* (ANS, NB). MONTGOMERY: Dayton, *Morgan*, Jy. 1879 (NB, US). INDIANA: BENTON: Barce, *Deam 11857* (CCD). BROWN: Belmont, *Deam 43459A* (CCD). CASS: Cicott, *Deam 25899* (ANS). FOUNTAIN: Fountain, *Deam 25819* (CCD). HARRISON: Elisabeth, *Deam 20529* (CCD). HENRY: Springport, *Deam 45344* (CCD). KOSCIUSKO: Winona Lake, *Deam 422* (CCD). LAWRENCE: Mitchel, *Deam 17263* (CCD). MARSHALL: Culver, *Deam 9017* (CCD). NEWTON: Thayer, *Deam 50607* (CCD). NOBLE: Albion, *Deam 20751* (NB). PERRY: Derby, *Deam 11534* (CCD). TIPTON: Kempton to Goldsmith, *Deam 13630* (CCD). WASHINGTON: Campbellsburg, *Deam 37154* (CCD). WHITE: Burnettsville, *Deam 39340* (ANS). ILLINOIS: CASS: Beardstown, *Geyer*, Jy. 1842 (ANS, G, Mo, NB, W). CHAMPAIGN: *Raymond*, Jy. 1869 (W). CHRISTIAN: Taylorville, *Andrews*, Aug. 1898 (CU). HANCOCK: Augusta, *Mead*, Jy. 1847 (NB). LOGAN: Lincoln, *Mills*, Jy. 1899 (G). MC LEAN: Hendrix, *Robinson*, Aug. 1904 (G). MASON: Havana, *Gleason*, Aug. 1903 (G). MENARD: Athens, *Hall*, ann. 1861 (G, US). PEORIA: Peoria, *Brendel* (NYS). ST. CLAIR: French Village, *Eggert*, Jy. 1886 (Mo). SHELBY: Windsor, *Gleason 748* (G). UNION: Cobden, *F.S.E.*, Jun. 1879 (CM). MISSOURI: "upper Missouri," *Geyer*, ann.

1835 (Mo). BARRY: Eagle Rock, *Bush 113* (G, Mo, NB, US). BOONE: W. Webster, *Drunshel (?) 1788* (Mo). BUTLER: Poplar Bluff, *Eby, Jy. 1893* (Mo). CALLAWAY: McCredie, *Schwab, Jy. 1924* (UP). DENT: Rhyse, *Kellogg 15309* (Mo). DUNKLIN: Pine City, *Bush 433* (Del, Mo). FRANKLIN: Gray Summit, *Kellogg 1212* (Mo). GREENE: Springfield, *Dewart 30* (Mo). IRON: Hogan, *Russell, Jy. 1898* (Mo). JASPER: Webb City, *Palmer 924* (Mo). JEFFERSON: Kimmswick, *Engelmann, Aug. 1866* (Mo). MC DONALD: *Bush, Jy. 1893* (Mo). MADISON: Mine La Motte, *Eggert, Jun. 1898* (Mo). NEWTON: Neosha, *Wilkins 2512* (ANS). PHELPS: Jerome, *Kellogg, Jy. 1912* (Mo). ST. LOUIS: St. Louis, open woods, *Engelmann, Jy. 1842* (Mo). SHANNON: Montier, *Bush 6128* (Mo). TANEY: Swan, *Bush 3437* (G, Mo). WASHINGTON: Irondale, *Glatfelter herb., Aug. 1895* (Mo). WEBSTER: Marshfield, *Partridge, Jy. 1908* (W). WRIGHT: Mansfield, *Palmer 6240* (Mo). ARKANSAS: BAXTER: Cotter, *Palmer 5964* (Mo). BENTON: *Plank, ann. 1899* (in part) (NB). CARROLL: Eureka Springs, *Palmer 4407* (Mo). FRANKLIN: Ozark, *Palmer 8148* (Mo, NB). FULTON: Mammoth Spring, *Demaree 5273* (US). JEFFERSON: Jefferson Springs, *Pennell 10668* (ANS). PULASKI: Little Rock, *Coville 64* (US). SEBASTIAN: Fort Smith, *Bigelow, ann. 1853-4* (US). WASHINGTON: Fayetteville, *Harvey 54* (ANS, CM, M, Mo). KANSAS: CHEROKEE: *Hitchcock 752* (G, Mo, NB, R, US). MIAMI: Paola, *Oyster, Aug. 1879* (Mo).

b) Var. **originalis**. TYPE LOCALITY of *L. spicata* Lamarck: Canada. TYPE SPECIMEN: In the Museum National d'Histoire Naturelle in Paris; the following description of it was furnished by Professor F. Gagnepain: "Anthères pales, à peine plus colorées (bleuâtres) que les filets. Sépales longs de 3.5-4 mm., complètement glabres, sans aucun cil, à oreillettes nulles. Calice égalant moitié du bouton à la veille de l'anthèse, dressé, puis un peu étalé à l'épanouissement de la fleur." (FIG. 25).—Not *Rapuntium foliis oblongis villosis* of the "Flora Virginica," as stated by DeCandolle (Prodr. VII: 374). This is probably *L. puberula* Mx.; Gronovius (1762) states that this plant (*Clayton n. 669*) flowers in September, which seems to rule out *L. spicata*. *L. spicata* Lamarck, Dict. Bot. III: 587. 1789. *L. Claytoniana* Michaux, Fl. Bor. Am. II: 153. 1803. Michaux also states that this is a synonym for Clayton's plant mentioned above. *L. goodenioides* Willdenow, Hort. Berol. I: plate 30. 1806. *L. pallida* Muhlenberg, Cat. Pl. Am. Sept. 22. 1813. Muhlenberg gives this name as a synonym for *L. goodenioides* Willd., but the material in the Muhlenberg herbarium, at the Academy of Natural Sciences of Philadelphia, is in such poor condition that it is impossible to determine the identity of *L. pallida*. *L. nivea* Rafinesque, Annals of Nature I: 15. 1820. *L. spicata* var. *parviflora* Gray, Syn. Fl. 6. 1878.—Stem strict, unbranched (rarely a few slender upright axillary branches bearing a few flowers), 20-110 cm. high, dark purplish-red and densely short-pubescent near the base, becoming smooth and light green above, made angular by the decurrent leaf-bases. Cauline leaves

3–20, usually not appressed to the stem, thin, sessile, or the lower narrowed into short margined petioles; the lower obtuse, oblanceolate, oblong or obovate, as large as 2.5×10 cm., shallowly coarse-dentate or sub-entire. Upper leaves gradually smaller, acute-lanceolate, often becoming more conspicuously denticulate above, and sometimes merging imperceptibly into the bracts of the inflorescence. All leaves strigose-pubescent above and below, especially near the margins and near the base of the plant. Basal leaves, if present, obovate, obtuse, pubescent, 1–12, narrowed into well-defined petioles. Inflorescence a

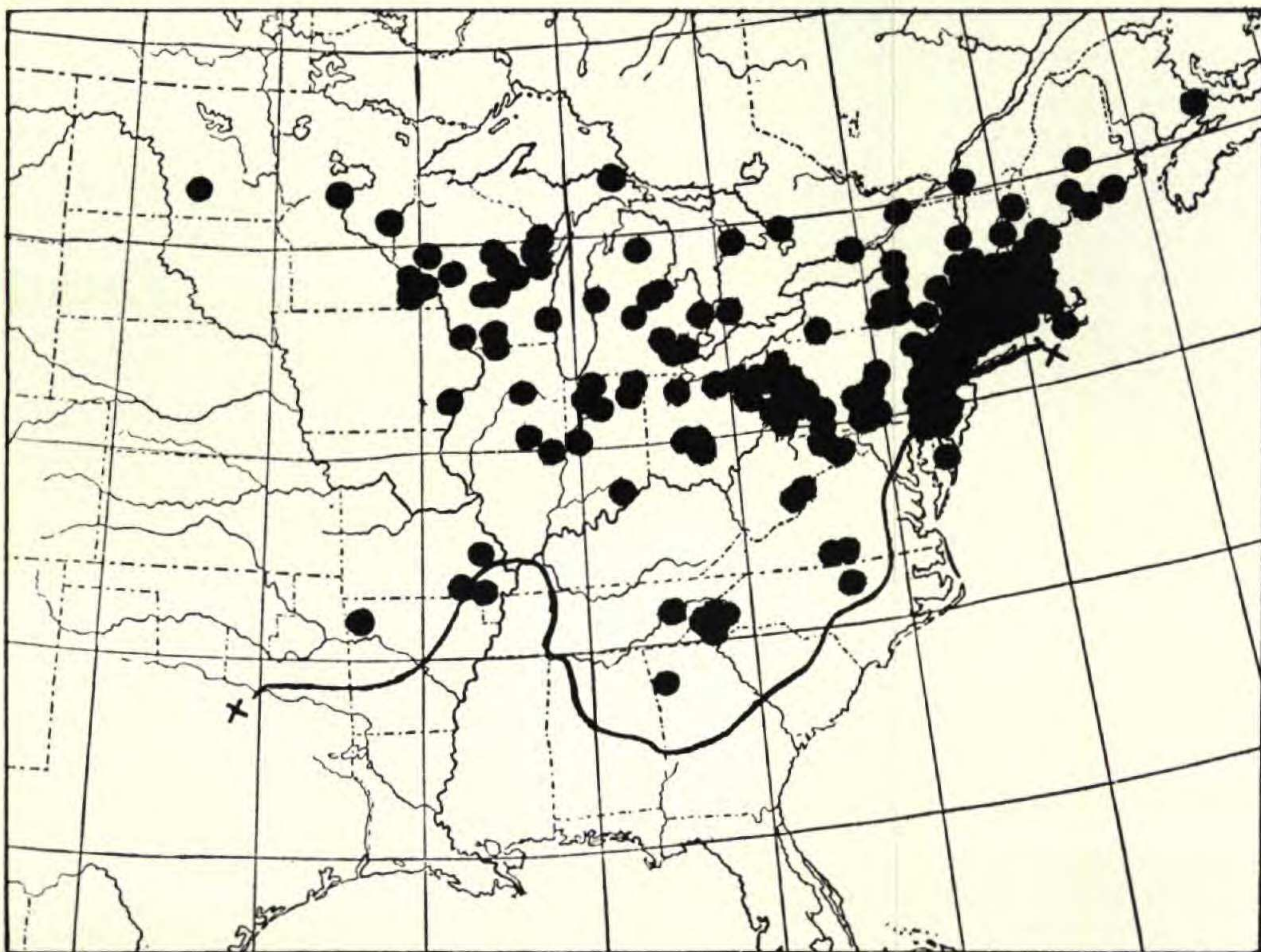


FIG. 15. Range of *LOBELIA SPICATA*, var. *ORIGINALIS*.

terminal virgate spike, 20–30 (60) cm. long, usually less than half the height of the plant, interrupted, not noticeably secund, bearing few–100 (in cases of fasciation 200 or more: the average is 30–60) flowers upon short (in fruit 5–8 mm.), slender, rough-puberulent pedicels, each with a pair of inconspicuous bracteoles near the base. Flower-bracts smooth (rarely ciliate-pubescent), narrowly lance-linear, about equalling the pedicels, or larger below, lanceolate, to 2.5 cm. long. Calyx in anthesis flattish or broad-conic, smooth or sparingly pubescent, becoming hemispheric in fruit, strongly ribbed, about 3.5 mm. in diameter. Capsule $\frac{1}{2}$ – $\frac{2}{3}$ inferior. Calyx-lobes subulate to deltoid, usually flat, 2.0–7.5 mm. long, smooth or somewhat bristly-ciliate; auricles usually present at the base of each lobe, distinctly short-triangular, or longer; in extreme cases filiform, as long as 1.0 mm.;

sometimes lacking. Flower 9–12 mm. long, including calyx. Corolla white to dark purplish-blue, smooth outside, the lower lip pubescent at the base inside. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip ovate, slightly shorter than the tube, not sharply reflexed; two upper lobes lanceolate, curved upward. Filament-tube 3.0–3.5 (in extremes 2.5–4.0 mm.) mm. long, pubescent below, connate about half its length above. Anther-tube 1.7–2.0 mm. long, light bluish-gray, the two smaller anthers each with a tuft of white hairs at the tip; the three larger smooth or merely pubescent on the backs. Style included in anther-tube. Meadows and thickets, preferring moist, rich soil (frequently in pastures and hayfields; becoming rather weedy); New Brunswick to Pennsylvania, and south in the mountains to Georgia; west to northern Michigan, eastern Minnesota and eastern Missouri; southern North Dakota; north-western Arkansas. Intergrading freely in the western part of its range with the vars. *hirtella* and *leptostachys*. Occasional plants in the Eastern States which are referred to var. *hirtella* seem rather to be more or less ciliate variants of typical var. *originalis*. Flower June 15–August 1, apparently a few days earlier along the Atlantic Seaboard. Representative Material seen: NEW BRUNSWICK: WESTMORELAND: Moncton, *Brittain*, herb. G. S. Can. 15266 (O). QUEBEC: HULL: Hull, *Harrington*, Jy. 14, 1905 (Toronto). ROUVILLE: Abbotsford, *Knowlton*, Aug. 1923 (G, Mo). ONTARIO: BRUCE: Big (=Dorcas) Bay, *Krotkoff* 7835 (Toronto). ESSEX: Sandwich, *Macoun* 724 (Toronto); *Macoun* (herb. G. S. Can. 88020) (O). GRENVILLE: *Thomson*, Jy. 1896 (Toronto). MIDDLESEX: London, *Millman*, Jun. 1879 (Toronto). MUSKOKA: Port Sydney, *Ivey*, Aug. 7, 1907 (Toronto). MAINE: ANDROSCOGGIN: South Poland, *Furbish*, ann. 1893, 1896, 1897 (NE). CUMBERLAND: Cumberland, *Chamberlain*, Jy. 1903 (US, W). FRANKLIN: Farmington, *Anderson* 684 (Toronto). HANCOCK: Mt. Desert, fields, *Redfield*, Jy. 1885 (ANS, NE). KENNEBEC: Augusta, *E. C. Smith*, Jy. 1886 (Mo, NE). LINCOLN: Bristol, *Chamberlain*, Jy. 1896 (NE). OXFORD: Rumford, *Parlin*, Jy. 1889 (NE). PISCATAQUIS: Dover, *Fernald* 311 (G, Mo, NB, NE, US, W). WASHINGTON: Machiasport, *Knowlton*, Jy. 1932 (NE). YORK: Kennebunk, *Hill* 107 (CU). NEW HAMPSHIRE: CARROLL: E. Wolfboro, *J. H. Fassett*, Jy. 1926 (W). CHESHIRE: Jaffrey, *Robinson* 231 (G, NE). COÖS: Gorham, *Pease* 16706 (NE); perhaps nearer var. *hirtella*. GRAFTON: Hanover, *Williams*, Jy. 1910 (G). HILLSBOROUGH: Peterboro, *Batchelder*, Jy. 1913 (US). MERRIMACK: Hooksett, *Batchelder*, Jy. 1921 (NE). ROCKINGHAM: Derry, *Batchelder*, Jy. 1913 (NB, NE). VERMONT: BENNINGTON: Manchester, *Day* 121 (G, US). CALEDONIA: Lyndon, Jy. 21, 1873 (NB). ORANGE: Fairlee, *Denslow*, Jy. 1923 (NB). RUTLAND: Clarendon, *Eggleston* 1423 (NB, US). WINDHAM: Vernon, *Robinson*, Aug. 1898 (G). WINDSOR: Queechee Gulf, *Kennedy*, Jy. 1890 (G). MASSACHUSETTS: BERKSHIRE: Stockbridge, *Hoffmann*, Aug. 1902 (NE). BRISTOL: Swansea, *Sanford* 10336 (part) (NE); Dartmouth, *Fernald* 1068 (part)

(NE). DUKES: Chilmark, *Harris*, Jy. 1898 (NE). ESSEX: Oakes (G, Mo, US). FRANKLIN: Buckland, *Forbes*, Aug. 1908 (NE). HAMPDEN: Granville, *Seymour* 396 (G). HAMPSHIRE: Prescott, *Goodale et al.*, Jy. 1931 (NE). MIDDLESEX: Framingham, *Eames*, Jy. 1906 (CU, UP). NORFOLK: Grantville, *Boott*, Jy. 1854 (NE). PLYMOUTH: Bridgewater, *Cushman*, Jy. 1908 (W). SUFFOLK: Revere, *Young*, Jy. 1877 (NE). WORCESTER: Webster, *Knowlton*, Jy. 1903 (NE). RHODE ISLAND: BRISTOL: Barrington, *Sanford* 10327 (NE). KENT: Warwick, *Fernald*, Jun. 1910 (G, NE). NEWPORT: Middletown, *Simmons*, Jy. 1898 (NE). PROVIDENCE: Providence, *Thurber*, Jun. 1844 (G). CONNECTICUT: FAIRFIELD: Greenwich, *Cushman and Sanford* 1129 (NE, W). HARTFORD: Southington, *Bissell*, Jy. 1897 (part) (Mo). LITCHFIELD: S. Canaan, *Greenman* 1423 (Mo). NEW HAVEN: New Haven, *Safford* 223 (US). NEW LONDON: Franklin, *Woodward*, Jy. 2, 1906 (G). NEW YORK: ALBANY: Elsmere, *House* 18401 (CU). BROOME: Binghamton, *Millsbaugh*, Jy. 1881 (CM). CATTARAUGUS: Quaker Bridge, *Alexander*, Aug. 1926 (NYS). CHEMUNG: Elmira, *Lucy* 12125 (NB). CHENANGO: Brisben, *Coville*, Jun. 27, 1887 (US). COLUMBIA: Kinderhook, *McVaugh* 2673 (CU, NYS, UP). DELAWARE: Bovina, *Hoy*, Jy. 1892 (CU). DUTCHESS: Stissing Mt., *McVaugh* 2862 (CU, NYS, UP). ESSEX: Minerva, *House* 15172 (NYS). GREENE: Platte Clove, *Williamson*, Jy. 1903 (ANS). HAMILTON: Back Log Camp, *M. E. Leeds* 1748 (ANS). LEWIS: Castorland, *Hotchkiss* 2667 (NYS). ONEIDA: Forestport, *Haberer* 2865 (G). ORANGE: Port Jervis, *Mackenzie* 4175 (Mo, NB). OSWEGO: Fulton, *DeForest*, Aug. 1882 (CU). QUEENS: Richmond Hill, *Bicknell* 8133 (NYS). RICHMOND: Garretsons, *Britton*, Jun. 1879 (ANS). SCHENECTADY: Schenectady, *Arnold*, ann. 1843 (CU). TIOGA: Apalachin, *Fenno* 262 (NB, NYS). TOMPKINS: Groton to McLean, *Randolph* 10819 (CU, G, NYS). ULSTER: Lake Minnewaska, *Sowden*, Jun.—Jy. 1922 (ANS). WASHINGTON: Shushan, *Dobbin* 166 (NYS). WEST-CHESTER: nr. Croton, *Pennell* 7673 (ANS). NEW JERSEY: BERGEN: Westwood, *Pennell* 9430 (ANS). BURLINGTON: Burlington (ANS). CAMDEN: Lindenwold, *Stone* 6570 (ANS). CUMBERLAND: Vineland, *Gross*, Aug. 1869 (ANS). HUDSON: Hoboken (NB). HUNTERDON: Bloomsbury, *Bebler*, Jy. 1927 (UP). MORRIS: Chatham, *Mackenzie* 245 (CCD). OCEAN: Highpoint, *Timmerman*, Jy. 1890 (NB; perhaps an error in locality). PASSAIC: Pompton Lakes, *Mackenzie* 4218 (US). SOMERSET: Watchung, *Moldenke* 1295 (ANS, Duke, Mo, NB, UP). SUSSEX: Cranberry Lake, *Mackenzie* 2749 (Mo). WARREN: Oxford, *Wherry*, Jun. 1934 (UP). PENNSYLVANIA: ALLEGHENY: Glenshaw, *Bright*, Jun. 1911 (CM). ARMSTRONG: S. W. *Knipe* (CM). BEAVER: *Andriessen*, ann. 1880–90 (CM). BERKS: Hamburg, *Leibelsperger* 366 (ANS). BLAIR: Altoona, *Mellor*, Jy. 1889 (CM). BUCKS: Neshaminy, *McDowell* 309 (ANS). BUTLER: Saxonburg, *Shafer* 65 (CM, CU, Pa, UP). CARBON: Leighton (ANS). CENTER: Juniata Jct., *Wherry*, Jun. 1934 (UP). CHESTER: W. Chester, *Wm. Darlington*, Short herb.

(ANS). CRAWFORD: Hartstown, *Jennings*, Jun. 1922 (CM). DAUPHIN: Harrisburg, *Small*, Jun. 1888 (G). DELAWARE: Newtown Twp., *MacElwee* 503 (ANS, G, Mo). FRANKLIN: Mercersburg, *T. Green*, May 1845 (ANS). LACKAWANNA: Dalton, *Twining*, Jy. 1907 (CM). LANCASTER: Reinholds, *Small*, Jun. 1890 (US). Lancaster, *Porter*, Jun. 1857 (G; type of var. *parviflora* Gray). LEHIGH: Allentown, *Pretz* 6716 (ANS). LUZERNE: Beech Haven, *Heller*, Jun. 1889 (ANS, G). MERCER: Sharon, *Aschman*, Jy. 1886 (CM). MIFFLIN: Lewistown, *Jennings*, Jy. 1908 (CM, Pa). MONROE: Pocono Lake, *Harshberger*, Jy. 1904 (ANS, Mo). MONTGOMERY: Tylersport, *Long* 24840 (ANS). NORTHAMPTON: Bethlehem, *Moser*, Jy. 1832 (US). PHILADELPHIA: Falls of Schuylkill, *Jeanes*, Jy. 1828 (ANS). SOMERSET: Stoyestown, *Patterson*, Jun. 1880 (CM). VENANGO: East Sandy, *Garber*, Aug. 1869 (ANS). WASHINGTON: Charleroi, *Jennings*, Jun. 1904 (CM). WEST-MORELAND: Ligonier to Donegal, *Jennings*, Jun. 1904 (CM). DELAWARE: NEWCASTLE: Stanton, *Randolph* 101 (CU, G). SUSSEX: Frankford, *Commons*, Jun. 1875 (ANS). MARYLAND: GARRETT: Oakland, *Shreve* 551 (US). HARFORD: Flintville, *Adams et al.* 929 (ANS). VIRGINIA: BEDFORD: *Curtiss*, Jy. 1871 (G). CAMPBELL: Lawyers Road, *Heller*, Jy. 1893 (ANS). WEST VIRGINIA: GREEN-BRIER: Cranberry Summit, *G. Guttenberg* (CM). POCAHONTAS: Rimel, *Core* 3488 (WVa). NORTH CAROLINA: BUNCOMBE: Biltmore, *Biltmore herb.* 626 (CU, M, US); Asheville, *Kraus*, Jun. 1925 (W). HAYWOOD: True Love Mt., *Blomquist* 5031 (Duke). JACKSON: Cullowhee, *Thaxter*, ann. 1887 (G). SWAIN; Great Smoky Mts., *Beardslee and Kofoid*, Aug. 1891 (Mo; near var. *leptostachys*). GEORGIA: FLOYD: Rome, *Ravenel* (Mo). ALABAMA: TALLADEGA: Riddell's Mill, *Mohr* (US; near var. *leptostachys*). TENNESSEE: KNOX: Dead Horse Lake, *Sharp*, Jun. 1930 (G). OHIO: CLARK: Springfield, *Williams* (Mo). CUYAHOGA: Berea, *Ashcroft*, Jy. 1897 (NB). ERIE: Castalia, *Jennings*, Aug. 1911 (CM). FAIRFIELD: Sugar Grove, *Werner* 98 (G). FRANKLIN: Columbus, *W.S.S.*, *Torrey herb.*, ann. 1840 (NB). MAHONING: Perkins, *Moseley*, Jy. 1894 (Mo). SUMMIT: Akron, *Ashcroft*, Jy. 1896 (Mo). WOOD: Bowling Green, *Moseley*, Jy. 1919 (Mo). INDIANA: LAGRANGE: Mongo, *Deam* 39084 (ANS). LAKE: Pine, *Deam* 43306 (CCD). NOBLE: Kendallville, *Deam* 36624 (ANS). PORTER: Crisman, *Deam* 31564 (part) (CCD). STEUBEN: Lake Gage, *Deam*, Jun. 1903 (CCD, G, Mo, NB, US, W). WARREN: Rainsville, *Deam* 25874 (CCD). ILLINOIS: CHAMPAIGN: Rantoul, *Gleason*, Jy. 1907 (G). DUPAGE: Naperville, *Wellner*, Jun. 1896 (W). JO DAVIESS: Portage, *Lansing* 4091 (ANS). LAKE: Beach, *Umbach* 3712 (W). LASALLE: Ottawa, *Huett* (G). MC LEAN: Bloomington, *Robinson*, Aug. 1886 (G). MICHIGAN: BAY: Bay City, *Dreisbach* 5958 (ANS). CHEBOYGAN: Indian River, *Ehlers* 2968 (W). CHIPPEWA: Sault Ste. Marie, *McMullen* (G). CRAWFORD: Grayling, *Mell* 214 (US); *Piper*, Jy. 1922 (US; G, in part). INGHAM: Haslett, *Yuncker* 415 (US). IONIA; Hubbardston, *E. F. Smith*, ann. 1877 (G). MASON: Ludington,

Chaney 12 (US). MENOMINEE: Menominee, *Schuette*, Jun. 1891 (US, W). MIDLAND: Midland, *Dreisbach 102* (ANS). ST CLAIR: Port Huron, *Glatfelter*, Jy. 1888 (Mo). WASHTENAW: Whitmore Lake, *Ehlers 1488* (G). WAYNE: Detroit, *Lugger*, Jy. 1891 (M). WISCONSIN: ADAMS: Friendship, *Rhoades*, Jy. 1927 (CU). BROWN: DePere, *Kellogg*, Jy. 1888 (US). BUFFALO: nr. Fountain City, *Finkelnburg* (CM). CRAWFORD: Prairie du Chien, *H. H. Smith 7636* (W). DANE: Madison, *Sprague 1200* (W). DUNN: Menomonie, *Bachman*, Jy. 1928 (W). EAU CLAIRE: Fall Creek, *Kunz 220* (W). IOWA: Dodgeville, *Breakey*, Jun. 1929 (W). JACKSON: Black River Falls, *H. H. Smith 6795* (W). JUNEAU: Camp Douglas, *Mearns 529* (NB). LAFAYETTE: Fayette, *Cheney*, Jy. 1888 (W). MARATHON: Mosinee, *Cheney 3270* (W). MARINETTE: Athelstane, *Davis*, Jy. 1915 (W). MILWAUKEE: Milwaukee, *Hasse* (NB). WALWORTH: E. Troy, *Almon*, Aug. 1926 (W). WAUPACA: Readfield, *A. Smith 110* (W). WAUSHARA: Richford, *Taylor*, Jy. 1932 (W). MINNESOTA: CASS: Bridgeman, *Sheldon 3289* (part) (M). MILLE LACS: Princeton, *Sheldon 3116* (M). OLMSTED: Rochester, *Ainslee*, Jy. 4, 1902 (M). SCOTT: Savage, *Rosendahl*, Sep. 1924 (part) (M). WABASHA: Lake City, *Manning*, Jy. 1892 (M). WASECA: Janesville, *Taylor 550* (M). MISSOURI: BUTLER: Poplar Bluff, *Eby*, Jy. 1893 (Mo). IRON: Pilot Knob, *Glatfelter*, Aug. 1895 (Mo). ST. LOUIS: *Engelmann*, May 1836 (ANS); *Eggert*, Jun. 1879 (Mo). ARKANSAS: WASHINGTON: Fayetteville, *Watts*, Jun. 1925 (W); this plant is perhaps related to *L. appendiculata*. NORTH DAKOTA: KIDDER: Dawson, *Metcalf 274* (CU).

c) Var. *HIRTELLA* Gray, Syn. Fl. 6. 1878. TYPE LOCALITY: "chiefly towards and beyond the Mississippi." TYPE SPECIMEN: authentic material seen in the Gray Herbarium.—*L. hirtella* Greene, Pittonia III: 349. Sep. 27, 1898.—Differs from the var. *originalis* in being bristly-pubescent nearly throughout; the lower stem is bristly, especially on the angles. Flower-bracts densely bristly, especially near the margins; the lower usually lanceolate, leafy, to 2.5 cm. long, often exceeding the flowers. Calyx densely bristly, especially on the conspicuous ribs. Calyx-lobes usually narrowly lance-linear (sometimes deltoid), 3.5–7.0 mm. long, bristly; often with a conspicuous raised midrib. Calyx in fruit hemispheric or varying to ovoid, 3.5–6.0 mm. long and 3.0–3.5 mm. across; capsule $\frac{1}{2}$ – $\frac{3}{4}$ inferior. Auricles of the calyx-lobes often conspicuous. Plants as a rule smaller than var. *leptostachys* or var. *originalis*; mostly 15–60 cm. high. Inflorescence usually 30–60 flowered. Leaves in many cases clustered on the lower half of the stem.—Low open meadows and prairies; sometimes in dry soil, north-western Indiana to eastern Kansas, northwest to western Nebraska, South Dakota, northern Minnesota, Saskatchewan (north to the 52d parallel), and Alberta. In nearly or quite typical form passing eastward through Michigan, northern New York and New England to the Gaspé Peninsula; apparently common on Long Island. Flower June 1–August 1; somewhat earlier in the southern part of its

range than in the northern. Representative Material seen: QUEBEC: GASPÉ: mouth of Grand River, *Pease 5255* (G). HULL: Chelsea, *Harrington, Jy. 1908* (O). ONTARIO: BRUCE: Big (=Dorcas) Bay, *Krotkoff 7835* (G). DURHAM: Hampton, *Allin, Jy. 1927* (Toronto). ESSEX: Leamington, *Macoun, herb. G. S. Can. 54135* (O). HASTINGS: Belleville, *Macoun 1115* (G); *Macoun 48* (Toronto). MUSKOKA: Port Sydney, *Ivey, Jy. 31, 1906* (Toronto). TIMAGAMI FOREST RESERVE: *Watson 1923* (Toronto). MAINE: ANDROSCOGGIN: E. Auburn, *Merrill 589* (NE). CUMBERLAND: Brunswick, *Furbish, ann. 1899* (NE). FRANKLIN: Chesterville, *Chamberlain, Jy. 1902* (NE). HANCOCK: Swan Island, *Hill 2247* (NE). OXFORD: Newry, *Williams, Jy. 1906*

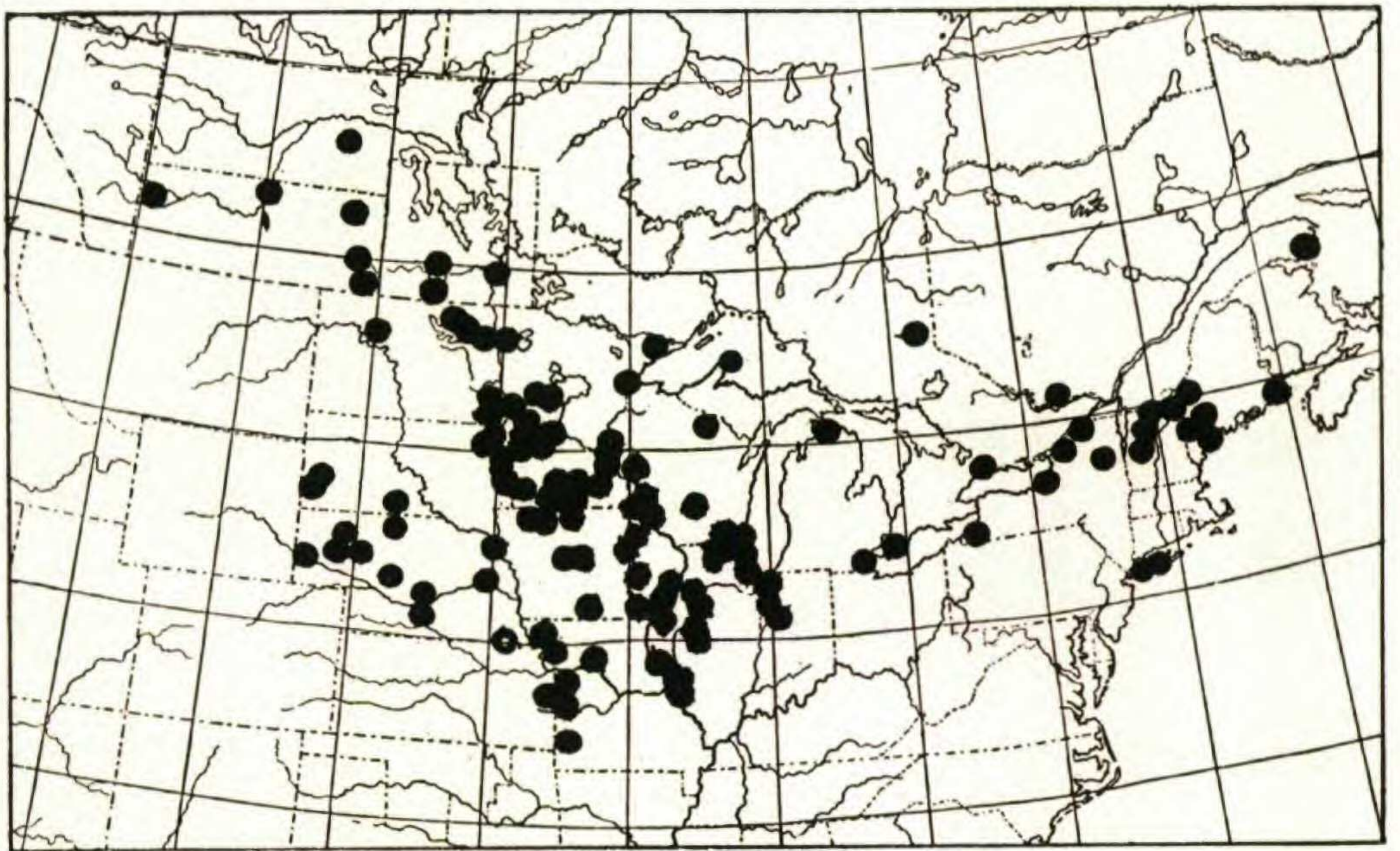


FIG. 16. Range of *LOBELIA SPICATA*, var. *HIRTELLA*.

(G). PISCATAQUIS: Milo, *Fernald, Sep. 1900* (NE). SOMERSET: Dead River, *Fernald, Aug. 1896* (NE). WASHINGTON: Carlow Island, *Fernald 2133* (G, NE). YORK: N. Berwick, *Parlin, Jy. 1893* (part) (G). NEW HAMPSHIRE: COÖS: Randolph, *Pease 18076* (NE). VERMONT: CALEDONIA: Peacham, *Blanchard, Jy. 1892* (Mo). ORLEANS: Willoughby, *Winslow, Jy. 1904* (NE). RUTLAND: Brandon, *Dutton, Jy. 1909* (Mo). NEW YORK: CHAUTAUQUA: Nashville, *Perkins, Jy. 1927* (CU). ESSEX: Newcomb, *House 9078* (G, NYS). NASSAU: Hempstead, *Gershoy 995* (CU). ST. LAWRENCE: Lisbon, *Phelps 914* (G, NB). SUFFOLK: Babylon, *Clute 157* (CM). INDIANA: CLARK: Clarke, *Umbach 3867* (W). LAKE: Gary, *McCoy, Jun. 1933* (Duke). NEWTON: Morocco, *Deam 31675* (CCD). PORTER: Dune Park, *Umbach 1074* (W). PULASKI: San Pierre, *Deam 43239* (CCD). WHITE: Idaville, *Deam 48852* (CCD). ILLINOIS: COOK: Chicago, *Moffatt 1883* (W). DUPAGE: Naperville, *Umbach 5532* (W). HANCOCK:

Augusta, *S. B. Mead*, Jun. 1859 (ANS). HENDERSON: Oquawka, *Patterson* (ANS, US). LAKE: Beach, *Johnson 1821* (NB). MC HENRY: Ringwood, *Vasey* ann. 1862 (G). MASON: Kilbourne, *Gleason*, Aug. 1903 (G). MENARD: Athens, *Hall*, ann. 1861 (G, Mo). OGLE: Holcomb, *Beck*, Jy. 1907 (W). PEORIA: Peoria, *McDonald*, Jun. 1903 (NB); Jun. 1904 (G). ROCK ISLAND: Joslin, *Harper*, Jy. 1886 (W). STARK: Wady Petra, *Chase 592* (ANS, Mo). WILL: Romeo, *Powell*, Jun. 1898 (W). WINNEBAGO: prairies, *Bebb*, Jy. 1858 (G). MICHIGAN: CHEBOYGAN: Burt Lake, *Ehlers 4634* (CU). KEWEENAW: Keweenaw Point, *Wood 1642* (NC, US); sterile hills, *Farwell*, ann. 1889 (G; fid. A. Gray). MONROE: Raisinville, *Atkinson*, Jun. 1883 (CU, US). WISCONSIN: BUFFALO: nr. Fountain City, *Finkelburg* (M). DANE: Primrose, *Fassett 3459* (G, NB, W). LACROSSE: LaCrosse, *Trelease* (probably), Jy. 1887 (Mo). RACINE: Racine, *Davis*, Jun. 1881 (W). ROCK: Janesville, *Skavlem*, Jun. 1889 (W). SAUK: Baraboo, *True* (W). VERNON: Viroqua, *H. H. Smith 7218* (W). WALWORTH: Delavan, *Hollister 25* (US). WINNEBAGO: Winnebago, *James*, Jy. 1894 (W). MINNESOTA: BLUE EARTH: *Leiberg*, ann. 1883 (M). BROWN: Springfield, *Sheldon*, Jy. 1891 (M). CHIPPEWA: Montevideo, *Moyer*, Jy. 1891 (M). CHISAGO: *Sandberg*, Jun. 1886 (M). CLAY: Glyndon, *Solheim 165* (R). DOUGLAS: Lake Christina, *Sheldon 3466* (M). HENNEPIN: meadows, *Sandberg*, Jy. 1890 (M, W). HOUSTON: Spring Grove, *Rosendahl 477* (M); *501* (G). JACKSON: Heron Lake, *Skinner*, ann. 1902 (M). KANDIYOHI: Spicer, *Frost*, Jy. 1892 (G, M, W). LAKE: Echo Lake, *Barber 12* (G). NICOLLET: Nicollet, *Ballard*, Jy. 1892 (M, R, US). OLMSTED: Rochester, *Ainslee*, Jun. 19, 1902 (part) (M). OTTER TAIL: Fergus Falls, *Sheldon 3699* (M). PIPESTONE: Pipestone, *Sheldon 1475* (M). POLK: Crookston, *MacMillan and Skinner 57, 297* (M). POPE: Glenwood, *Taylor*, Jy. 1891 (M). RAMSEY: New Brighton, *Moyer*, Jun. 1897 (M). ST. LOUIS: Duluth, *Johnson 1263* (part) (NB). SCOTT: Savage, *Rosendahl*, Sep. 1924 (part) (M). STEARNS: Pleasant Lake, *Campbell C165* (M). WATONWAN: St. James, *Fowler 25037* (W). WINONA: Winona, *Holzinger*, Aug. 1890 (US). IOWA: BENTON: Vinton, *Davis* (W). BLACK HAWK: low prairie, *Burk 388* (Mo). DECATUR: *J. P. Anderson*, Jun. 1902 (Mo, R). EMMET: Armstrong, *Cratty*, Aug. 1898 (US). FAYETTE: Fayette, *Parker* (M). GREENE: Grand Junction, *Wiegand et al. 2401* (CU). JOHNSON: Iowa City, *Somes 3202, 3204* (US). KOSSUTH: Wesley, *Breithaupt*, Jun. 1898 (W). STORY: Ames, *Ball and Combs 500* (G, Mo, R, US). VAN BUREN: Bentonsport, *Graves 1894* (Mo). MISSOURI: CHARITON: *Young*, Jun. 1925 (CM). JEFFERSON: "Crystall City," *Eggert*, Aug. 1886 (CM). MARION: Hannibal, *Davis 1190* (Mo). NODAWAY: Marysville, *Palmer 25434* (Mo). NORTH DAKOTA: "upper James River," (no state given), *Geyer*, Nicollet's N. W. Exp., Jy. 13, 1839 (US). BENSON: Leeds, *Lunell*, Jy. 6, 1901 (ANS, M, R, W). CASS: Buffalo, *Westergaard*, Aug. 1897 (R). GRAND FORKS: Grand Forks, *Brannon 240* (Mo). NELSON: Tolna, Jy. 25, 1911 (R). RICH-

LAND: Fairmount, *Bergman* 2326 (ANS, M, Mo). WARD: Minot, *Lakela* 489 (M). SOUTH DAKOTA: BROOKINGS: Brookings, *Williams*, Jy. 21, 1893 (ANS, M, Mo). CUSTER: Custer, *Rydberg*, 850 (US). DAY: Waubay, *Moore* 55 (M). DEUEL: Toronto, *Moore* 885 (M). MEADE: Piedmont, *Pratt*, Jun. 1895 (M). MOODY: Flandreau, *Griffiths*, Aug. 1892 (Mo, US). ROBERTS: White Rock, *Powell*, ann. 1903 (G). TRIPP: Keya Paha River, *E. J. Wallace* (NB). NEBRASKA: BROWN: Long Pine, *Bates*, Jy. 1895 (M). BUFFALO: Kearney, *E. R. Holmes*, Jun. 1887 (NB); "Ft. Kearney on the Platte," *H. Engelmann*, Jun. 1858 (Mo.). CEDAR: Aten, *Clements* 2656 (CU, Del, G, M, US). CHERRY: sand-hills, *Smith and Pound* 37 (Mo). CUSTER: Callaway, *Bates* 2358 (G). GRANT: Whitman, *Rydberg* 1818 (G, US). KEARNEY: Minden, *Hapeman*, Jy. 1897 (W). PLATTE: Columbus, *Pennell* 16014 (ANS). SCOTTS BLUFF: Platte Bottom, *Rydberg* 222 (US). THOMAS: Halsey, *Krautter*, Jy. 1907 (UP). KANSAS: LEAVENWORTH: "Ft. Kearney to Ft. Leavenworth," *Fendler* 79 (G). MIAMI: Paola, *Oyster*, Jy. 1883 (US). MANITOBA: "N. W. Territory," *Nicollet* 414 (ANS) (not surely from Man.). BRANDON: Brandon, *Macoun*, herb, G. S. Can. 14146 (O, US). SOURIS: Turtle Mt., *T.J.W.B.* 139, Jy. 1874 (Toronto). WINNIPEG: Winnipeg, *Scott*, Jy. 1904 (Toronto). SASKATCHEWAN: "20 m. W. Yorkton, along Grand Trunk Pacific R. R.," *Macoun*, herb, G. S. Can. 78479 (CM, CU, G, O); Moose Mt., *Macoun*, Jy. 1883 (Del); "near the South Saskatchewan," *Macoun*, herb, G. S. Can. 15253 (O). ASSINIBOIA: Souris Plain, *Macoun*, herb, G. S. Can. 15254 (O). HUMBOLDT: Wadena, *McGugan* (Toronto); Touchwood Hills, *Macoun and Herriot*, herb, G. S. Can. 78480 (O). ALBERTA: CRAIGMYLE: prairie, "SE 28-32-16 W 4," *Brinkman*, Jy. 1923 (US).

NOTE: While the above are all referred to the var. *hirtella*, it should be observed that the variety reaches its most characteristic form only in the region west of the Mississippi, and occasionally eastward. From Wisconsin eastward, most plants seen lack the short stature of the prairie plant, and are placed in var. *hirtella* because of the combination of general bristly pubescence, combined with leafy flower-bracts.

d) Var. **campanulata**, var. nov.; caule paucifloro, calycis tubo oblongo vel hemisphaerico, antheris albis, capsulis subinflatis. TYPE LOCALITY: Kinderhook, Columbia Co., N. Y. TYPE SPECIMEN: *McVaugh* 2673A; deposited at the University of Pennsylvania; duplicates at Cornell University and the New York State Museum. Vegetatively not to be distinguished from the var. *originalis*. Inflorescence a loose terminal raceme, hardly more than a third the height of the plant, not noticeably secund, bearing 10-35 (50) (ave. 20-25) widely spaced flowers upon short (in fruit 4-5 mm.), rather stout, rough-puberulent pedicels, each with a pair of inconspicuous bracteoles near the base. Flower-bracts smooth, linear, somewhat longer than the pedicel (5-9 mm. long), callose-denticulate. Calyx in bud



Lobelia spicata. Lam. dict.
 envoi de Canada pennsylvanica

HERB. MUS. PARIS.

Herbier de LAMARCK
 Acquis en Novembre 1800.

TYPE of LOBELIA SPICATA Lam.

and in anthesis short-campanulate, smooth or slightly puberulent, becoming sub-globose in fruit, strongly ribbed, 3.5–5.0 mm. across by 4.5–6.0 mm. high. Capsule $\frac{2}{3}$ inferior or more. Calyx-lobes short-lanceolate, flat, 3–4 mm. long, smooth, entire; auricles lacking. Flower 7–9 mm. long, including the campanulate calyx. Corolla distinctly dark-purplish, smooth, except for the slightly pubescent base of the lower lip. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip ovate-oblong, slightly shorter than the

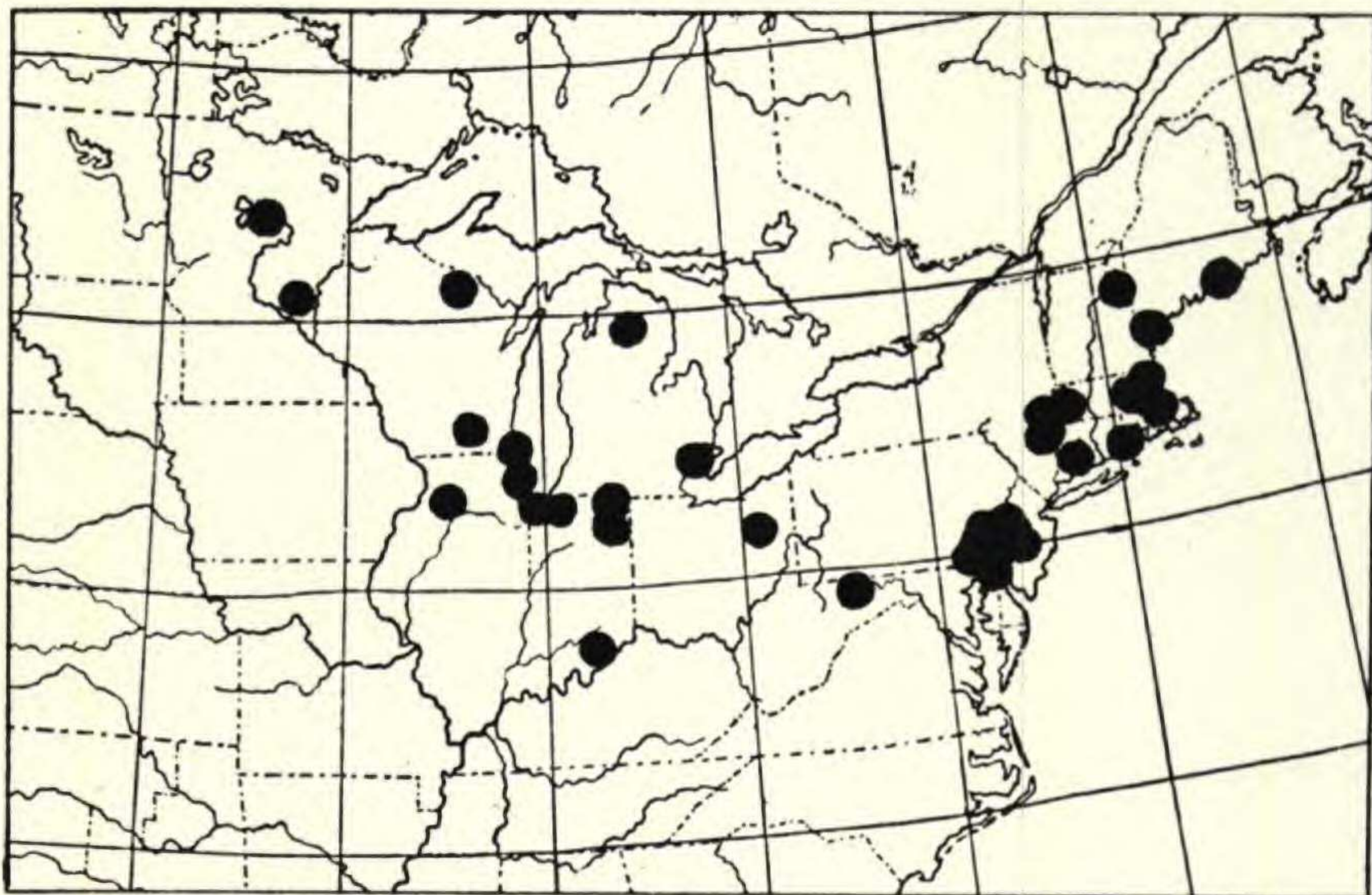


FIG. 17. Range of *LOBELIA SPICATA*, var. *CAMPANULATA*.

tube, not sharply reflexed; two upper lobes lanceolate. Filament-tube 2.0–2.5 (3.0) mm. long, slightly pubescent below, connate about half its length above. Anther-tube 1.0–1.5 mm. long, white, the two smaller anthers tufted, the three larger smooth or pubescent on the backs. Style exerted, recurved. Seeds apparently somewhat larger than in var. *originalis*.

This plant differs from var. *originalis* by the campanulate calyx, the globose, larger capsules, white anthers, smaller flowers in every way, fewer flowers, earlier flowering period (7–10 days in eastern New York). It probably does not deserve specific rank, as plants with white anthers and small flowers are sometimes found in the other varieties of *L. spicata*. This phenomenon may be one of arrested development or some other abnormality, as similar conditions are seen occasionally in other parts of the genus (e.g. *L. puberula*). However, when the earlier flowering period is considered, as well as the definite changes in calyx, capsule and inflorescence, it seems desirable to separate this plant from var. *originalis*.

Everywhere with var. *originalis*, but apparently rare except on the Eastern Seaboard from southern Maine to Pennsylvania; from Pennsylvania to Virginia it intergrades freely with the var. *scaposa*.

Flowers a few days earlier than var. *originalis*; from June 1. Material seen: MAINE: HANCOCK: Mt. Desert, fields nr. Long Pond, *Redfield*, Jy. 1892 (part) (NE). YORK: N. Berwick, *Parlin*, Jy. 1892 (1 sheet) (G). NEW HAMPSHIRE: COÖS: Dalton, *Pease 12150* (part) (NE). VERMONT: ADDISON: Ferrisburgh, *Horsford*, ann. 1882 (part) (G). MASSACHUSETTS: BERKSHIRE: Tyringham, *Vail*, Jun. 1897 (NB). BRISTOL: Swansea, *Sanford 10336* (part) (NE); Dartmouth, *Fernald 1068* (part) (NE). ESSEX: Montserrat, *Hubbard*, Jy. 1913 (NE); S. Georgetown, *Williams*, Aug. 1899 (NE). MIDDLESEX: Concord, *Deane*, Jy. 1886 (NE). S. Acton, *Deane*, Jy. 1886 (part) (US); Chelmsford, *Eames*, Sep. 1914 (CU). NORFOLK: Needham, *Fuller*, Jy. 1883 (part) (NE); Norfolk, *Ware 2485* (part) (NE). CONNECTICUT: *Chas. Wright* (part) (CM). HARTFORD: Southington, *Bissell*, Jy. 1897 (part) (Mo). NEW LONDON: Franklin, *Woodward*, Jy. 11, 1906 (G, NE). NEW YORK: COLUMBIA: Kinderhook, *McVaugh 2673A* (CU, NYS, UP). DUTCHESS: Madalin, *McVaugh 2674A* (UP). ST. LAWRENCE: Lisbon, *Phelps 914* (CU). NEW JERSEY: BURLINGTON: Mt. Holly, *Meredith*, Jun. 1922 (ANS). PENNSYLVANIA: BERKS: Lobachsville, *Long 12632* (ANS). BUCKS: Upper Black Eddy, *True*, Jy. 1925 (part) (UP). CHESTER: Paoli, *Pennell 3905* (part) (UP); West Chester, *Pennell 1224* (ANS). DELAWARE: Haverford, *Burk* (part) (UP); Lenni, *Redfield 4516* (Mo); Wawa, *Pennell 21* (part) (ANS); Williamson, *Pennell 194* (part) (ANS). LANCASTER: Lancaster, *Stevens*, Jy. 1874 (part) (Mo). MONTGOMERY: Penllyn, *MacElwee*, Jun. 1903 (1 plant, ANS). NORTHAMPTON: Easton, *Porter*, Jun. 1896 (ANS). DELAWARE: NEWCASTLE: Centreville, *Commons*, Jun. 1866 (part) (ANS). MARYLAND: GARRETT: dry open woods, *J. D. Smith*, Jy. 24, 1883 (US). OHIO: STARK: Canton, *Steele 14* (US). INDIANA: CLARK: *Deam 6897* (part) (CCD). LAGRANGE: Mongo, *Deam 20706* (CCD). LAKE: Hammond, *Deam 1456* (part) (CCD). NOBLE: Eagle Lake, *Deam 31252* (part) (CCD). PORTER: Crisman, *Deam 31564* (part) (CCD). ILLINOIS: *Vasey*, herb. Olney (G). COOK: Chicago, *Babcock*, Jun. 1874 (part) (US). LAKE: Waukegan, *Umbach 5840* (W). WHITESIDE: Fulton, *Harper*, Jun. 1892 (W). MICHIGAN: CRAWFORD: Grayling, *Piper*, Jy. 1922 (part) (G). WAYNE: Detroit, grassy fields, *Farwell*, Jun. 1900 (part) (G). WISCONSIN: DANE: Madison, *Trelease*, Jun. 1889 (part) (Mo). MINNESOTA: ANOKA: Centreville, *Sandberg*, Jy. 30, 1891 (part) (Del); "Northern A. Co.," *Butters and Rosendahl 5056* (M). CASS: Bridgeman, *Sheldon 3289* (part) (M); this also shows its affinity to var. *hirtella*. OLMSTED: Rochester, *Ainslee*, Jun. 1902 (part) (M). IOWA: DECATUR: *Fitzpatrick*, May 1896 (part) (Mo).

e) Var. **scaposa**, var. nov., foliis radicalibus ovatis obtusis petiolatis, caulinis raris parvis, racemo elongato laxo, calycis appendicibus non longis. TYPE LOCALITY: "Danville to Fall Creek" (Pittsylvania Co., Va.). TYPE SPECIMEN: *Small and Heller 108*, Jun. 3, 1891, in the University of Penna.—Possibly *L. pallida* Muhlenberg, Cat. Pl. Am. Sep. 22. 1813. Probably *L. pallida* Elliott, Sk. Bot. S. C. & Ga.

I: 265. 1821 (in part). Probably *L. paniculata* Rafinesque, N. Fl. N. Am. II: 18. 1836. *L. spicata* Hitchcock and Standley, Fl. Dist. Col. 263. 1919.—Stem strict, unbranched, 40–110 cm. high (ave. about 65 cm.), green, or with a slight reddish tinge near the base; smooth, or pubescent, especially on the angles, below. Cauline leaves inconspicuous, thin, 1–6, usually only about 3 in number, all below the middle of the stem, all acute, bract-like, 1–2 cm. long, lanceolate, sharp-denticulate, or the lowest one oblanceolate or oblong, obtuse, about 1.5×5.0 cm. (in extreme cases 2.5×9.0 cm.). Basal leaves 1–12, conspicuous, obovate, ovate or round, narrowed into margined petioles, $1.5\text{--}5.5 \times 3\text{--}10$ cm. (ave. about 3.5×5). All leaves more or less strigose-pubescent, especially near the margins and near the base of the plant. Inflorescence a loose terminal raceme, 10–60 cm. long (ave. about 30 cm.), usually about half the height of the plant, appearing naked, because of the disproportionately large basal leaves; somewhat interrupted, sometimes sub-secund, bearing 10–90 (ave. about 40) widely spaced flowers upon short (in flower 4–6 mm.) slender pedicels, each with a pair of inconspicuous bracteoles near the base. Flower-bracts smooth, lance-linear or sometimes narrowly lanceolate, about equalling the pedicels, 4–10 mm. long. Calyx in anthesis broad-conic, smooth, becoming hemispheric to sub-globose in fruit, about 4 mm. in diameter. Capsule (where seen) $\frac{2}{3}$ inferior. Calyx-lobes lanceolate to linear, 2–6 mm. long, smooth, entire; auricles usually conspicuous at the base of each lobe, triangular or short-filiform. Flower 7.0–10.5 mm. long, including calyx (ave. 9.0 mm.). Corolla pure white to light blue, the lower lip pubescent at base inside, otherwise smooth. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip ovate, shorter than the tube, sometimes sharply reflexed in dried material; the two upper lobes lanceolate, recurved or erect. Filament-tube 3.0–3.5 mm. long, pubescent below, connate about half its length above, often deflexed, so that the anther-tube and the upper part of the filament-tube are not contained in the corolla, but project above it, through the dorsal fissure. Anther-tube 1.7–2.0 mm. long, light bluish-gray, the two smaller anthers tufted at the tip, the three larger smooth or pubescent on the backs.

Differs from var. *originalis* by the larger basal leaves, fewer stem-leaves, the naked inflorescence, which is longer in proportion, the more conspicuous auricles, slightly smaller flowers, broader calyx, earlier flowering period. Is sometimes confused with var. *leptostachys* because of the auricles, which may be conspicuous, but the almost naked stem should prevent such a mistake.—Low open woods and hillsides, in moist or dry situations, southern Pennsylvania to central North Carolina, central Mississippi, and Louisiana. Apparently mostly confined to the Piedmont. Flower May 20–June 20. Material seen: PENNSYLVANIA: *Rev. J.H.B.* (Porter herb.), Jun. 10, 1845 (ANS). FRANKLIN: Mercersburg, *Detwiller herb.*, Jun. 2, 1845

(ANS); Mt. Alto, *Illick*, ann. 1909 (Mo). FULTON: Big Cove Tannery, *Gress*, Aug. 1921 (Pa). YORK: Loganville, *Glatfelter*, Jun. 1895 (Mo); York Furnace, *Stone 2919* (ANS). MARYLAND: ALLEGANY: Cumberland, *J. D. Smith*, Jy. 1883 (US); Cumberland, *Shriver*, Jy. 1894 (NB). BALTIMORE: *J. D. Smith*, Jun. 8, 1880 (US); "nr. Baltimore," *D. Foreman*, ann. 187- (US); Woodbrook, *Waters*, Jun. 1892 (US). CECIL: Elkton, *Long 34066* (ANS). MONTGOMERY: Glen Echo, *Pollard 292* (US); Chevy Chase, *Wherry*, May 1934 (UP); Rockville, *Painter 1344* (Mo); Kensington, *House 1000* (Mo); "nr. D. C. line at Mass. Avenue," *Bowen #6* (UP). WASHINGTON: Harpers Ferry,

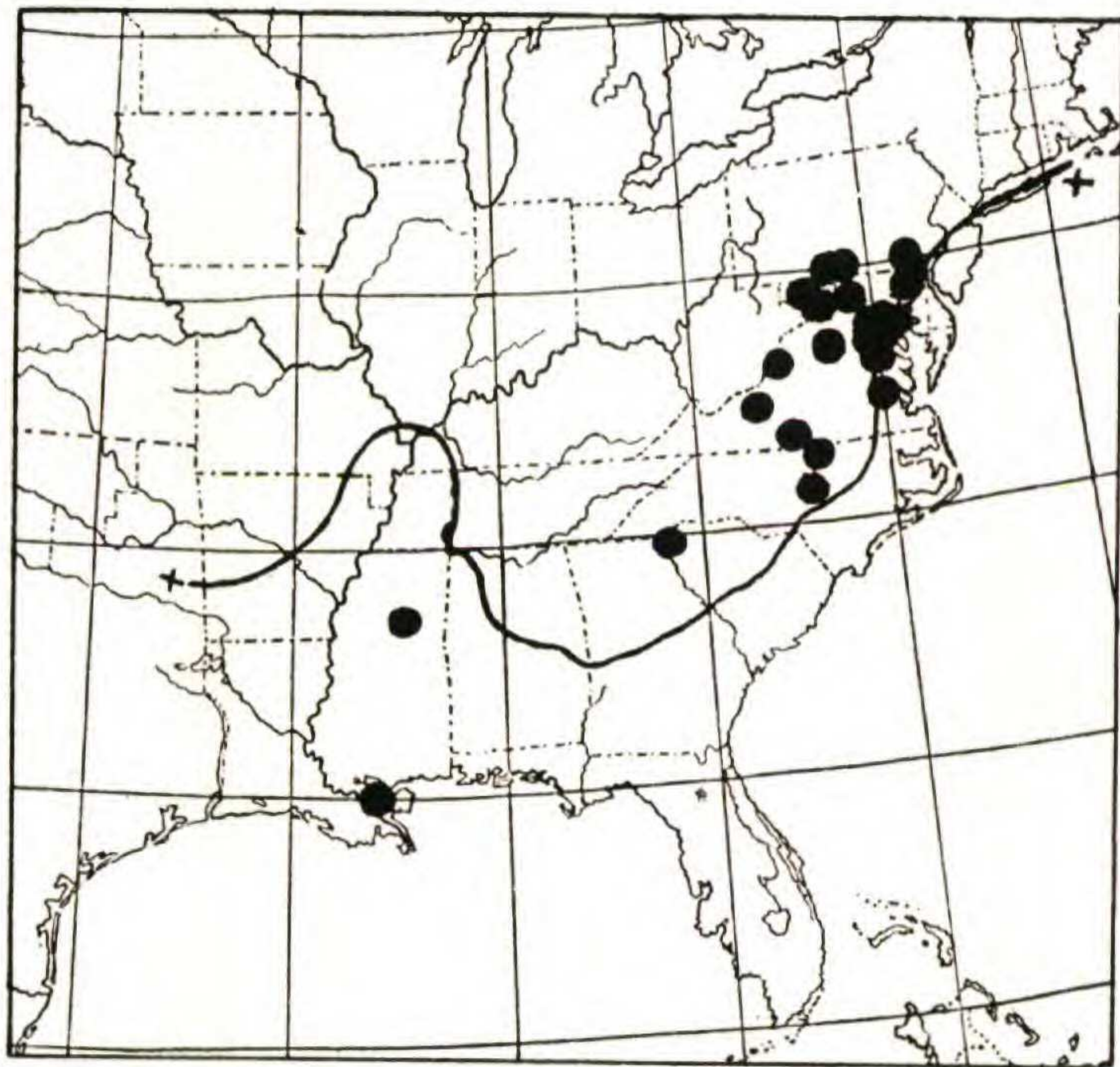


FIG. 18. Range of *LOBELIA SPICATA*, var. *SCAPOSA*.

Topping, May 1897 (US). DISTRICT OF COLUMBIA: Washington, *W. A. Henry*, Jun. 1879 (W); Rock Creek, *Comstock*, May 1881 (CU); "nr. Washington," *Blanchard*, May 1891 (NB); Washington, *Kearney*, Jun. 1897 (NB). VIRGINIA: "oak forests," *Tidestrom 6366* (US). ARLINGTON: Ft. Myer, *Mearns*, Jun. 1895 (G, NB). BATH: Millboro, *Wherry*, Jun. 1934 (UP). CHESTERFIELD: Winterpock, *Wherry*, May 1934 (UP). FAIRFAX: Chain Bridge, *Sheldon*, Jun. 1881 (NYS); Great Falls, *Moore 4521* (G); Occoquan, *Randolph 157* (CU, G). MONTGOMERY: Blacksburg, *Murrill*, Jun. 1895 (NB); PAGE: Luray, *A. Brown et al.*, Jun. 1890 (ANS, NB). PITTSYLVANIA: Danville to Fall Creek, *Small and Heller 108*, Jun. 3, 1891 (ANS, M, NB, UP). PRINCE WILLIAM: Buckland, *Meredith*, May 1922 (ANS); Gainesville, *Pennell 13326* (ANS). SPOTSYLVANIA: Fredericksburg, *Wright, et al.*, May 1917 (CU). STAFFORD: Falmouth, *Wiegand and Manning 3092*

(CU, G). WEST VIRGINIA: HAMPSHIRE: Hanging Rock, *Frye*, Jun. 7, 1933 (WVa); Hanging Rock, *Koenig*, Aug. 1887 (WVa); Hietts Run, *W.V.U. Bot. Exp.*, Jy. 2, 1926 (WVa). NORTH CAROLINA: CHATHAM: 12 m. S. Chapel Hill, *Totten*, Jun. 1931 (NC). ORANGE: Chapel Hill, *Totten*, Jun. 1915 (NC). PERSON: *Blomquist 5030* (Duke). SOUTH CAROLINA: OCONEE: Newry, *House 3477* (NB). MISSISSIPPI: CHOC-TAW: *Ackerman, Jensen*, Jun. 1905 (Mo). LOUISIANA: ORLEANS: "nr. New Orleans, *Dr. Ingalls*," Torrey herb. (NB).

The following list is made up of specimens which seem not to belong

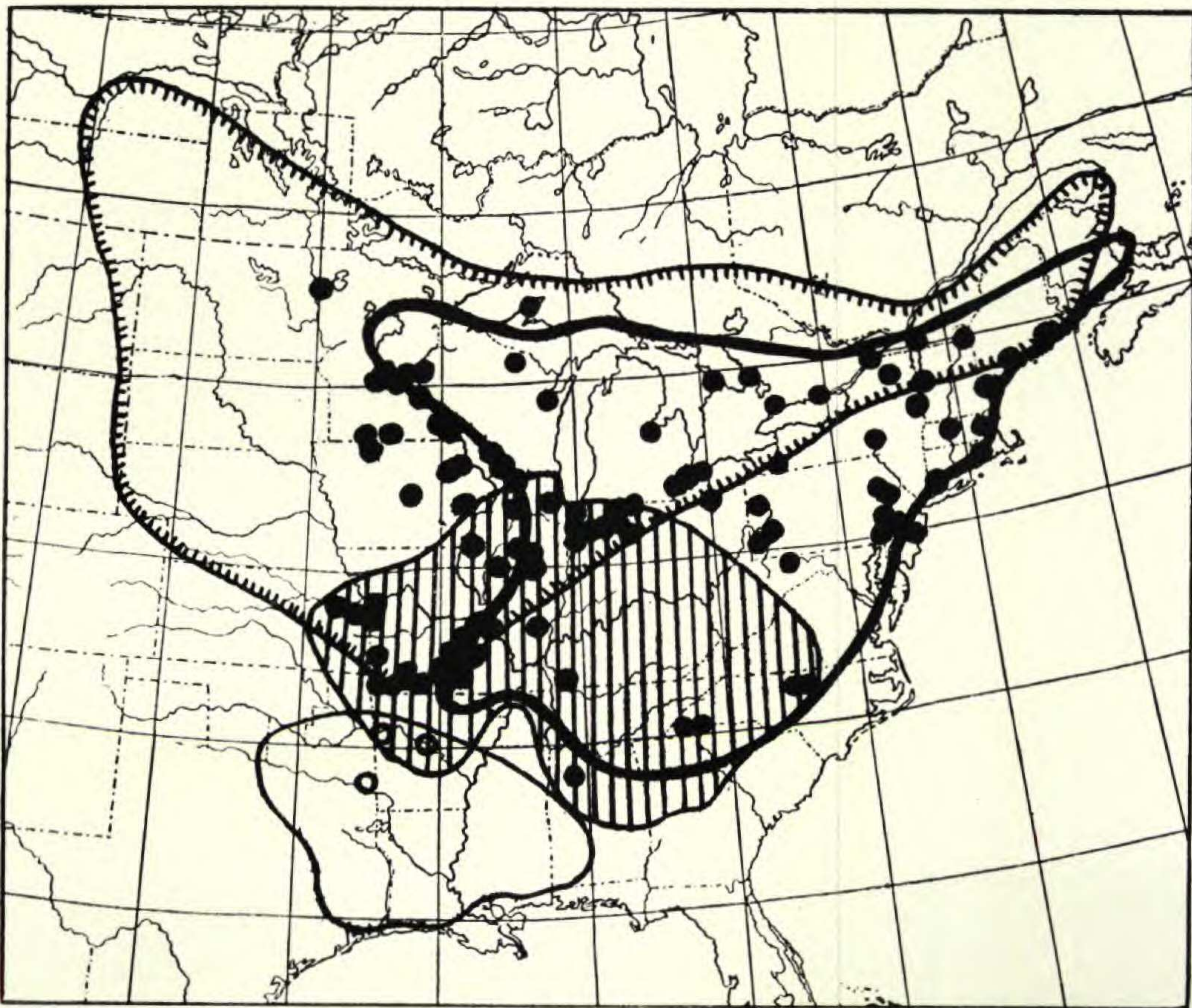


FIG. 19. Ranges of Varieties of *LOBELIA SPICATA*: Var. *LEPTOSTACHYS* (vertical lines); var. *ORIGINALIS* (oblique lines, left to right); var. *HIRTELLA* (oblique, right to left). Range of *L. APPENDICULATA* (plain). Dots represent plants not surely referred to any of the named forms; that is, intermediates. Records from the Atlantic states and southern New England are merely of occasional hairy individuals of the smooth var. *ORIGINALIS*.

to any of the named varieties of *L. spicata*, but to possess features peculiar to two or more of the varieties; that is, they seem to be intermediates of various sorts. The initials in parenthesis after each citation indicate the varieties which the specimen seems to resemble most closely. The letters "app" stand for *L. appendiculata*. VIRGINIA: STAFFORD: Falmouth, *Wiegand and Manning 3093* (CU)

(sc-ca). KENTUCKY: CHRISTIAN: "barrens," *C. W. Short* (ANS) (lep-or). INDIANA: ALLEN: Ft. Wayne, *Deam 1337* (CCD) (lep-or). FULTON: DeLong, *Deam 39265* (CCD) (lep-or). KOSCIUSKO: Leesburg, *Deam 5118* (NB) (lep-or). ILLINOIS: DUPAGE: Lisle, *Martinek*, Jy. 1919 (US) (lep-or). MACON: 6 m. W. Decatur, *Clokey*, Jy. 1915 (NYS) (lep-hir). PEORIA: Peoria, *McDonald*, Jy. 1890 (G) (lep-hir); Peoria, *Brendel* (NYS) ("Parum differt a *Lobelia spicata*, et probabiliter transit in illem"; lep-or). RICHLAND: Amity, *Ridgway 3205* (ANS) (lep-hir). WASHINGTON: *French*, Jy. 1872 (NB) (lep-hir). WINNEBAGO: *Bebb*, Jy. 1858 (ANS) (lep-or). MICHIGAN: SAGINAW: Chesaning, *Dreisbach 5121* (ANS) (hir-or). WISCONSIN: ONEIDA: Virgin (?) Lake, *Hoffmann*, Aug. 1918 (Mo) (hir-ca). MINNESOTA: FARIBAULT: Minnesota Lake, *Taylor 563* (M) (hir-or). GOODHUE: Red Wing (CU) (hir-or). IOWA: DICKINSON: Lake Okiboji, *Overholts et al.*, Jy. 1926 (Mo) (hir-or). FAYETTE: *Fink 237* (US) (hir-or). LOUISA: Columbus, *Palmer 40551* (NB) (hir-or). MISSOURI: BATES: *Broadhead*, May 1871 (Mo) (hir-or). CRAWFORD: *Woodson 595* (Mo) (hir-lep-or). GREENE: Springfield, *Standley 9034* (US) (hir-lep); IRON: "eastern Iron Co.," *Trelease 669* (Mo) (lep-or). JACKSON: Waldo Park, *Bush 479* (Mo, US) (lep-hir-or); Martin City, *Bush 3038* (G, Mo, NB) (lep-hir). JASPER: Webb City, *Palmer 2095* (G, Mo, US) (lep-hir). LACLEDE: Lebanon, *Pennell 11648* (part) (ANS) (lep-or). OREGON: Alton to Thayer, *Trelease*, Jy. 1895 (Mo) (lep-or). POLK: "Stockton Road," *Trelease 449* (Mo) (lep-or). ST. CHARLES: Gilmore, *Kellogg 2026* (Mo) (hir-or). ST. FRANCOIS: Bismarck, *Dewart 72* (Mo) (lep-or). ST. LOUIS: St. Louis, *Monell*, Sep 1838 (Mo) (hir-or); St. Louis, *Eggert*, Jy. 1875 (ANS, CM, Mo, NB, R, US) (lep-or). TEXAS: Plato, *Emig 161* (Mo) (lep-or). ARKANSAS: BENTON: *Plank*, ann. 1899 (part) (NB) (lep-app ?). SEBASTIAN: Big Creek, *Demaree 3137* (ANS) (? - app). OKLAHOMA: MC CURTAIN: Idabel, *Houghton 3658* (G, Mo, NB) (app - ?). KANSAS: WABAUNSEE: *Norton and Clothier 318* (G, Mo, R, US) (lep-hir-ca). WYANDOTTE: *Rosedale, Mackenzie*, Jy. 1896 (NB) (lep-hir).

10. *L. INFLATA* Linnaeus, *Spec. Pl. II*: 931. 1753. TYPE LOCALITY: "Habitat in Virginia, Canada." TYPE SPECIMEN: There are in the Linnean Herbarium in London two examples of this plant, both seen by Linnaeus before 1753. The first is marked by him "Locus e Senegall," which is no doubt an error. The second is a flowering specimen, collected by Kalm, and marked by Linnaeus "*L. Cliffortiana*." Photographs seen. This species, which in early flower lacks the characteristic inflated capsules, and bears a slight superficial resemblance to the southern *L. Cliffortiana* L., is probably the basis of the many reports of the latter species from Virginia:—*L. caule erecto, foliis cordatis* (Clayt. n. 196), Gronovius, *Fl. Vir.* 107. 1739. *L. cliffortiana* Michaux, *Fl. Bor.-Am. II*: 152. 1803. Pursh, *Fl. Am. Sept. II*: 448. 1814. *L. Michauxii* Nuttall, *Gen. N. Am. Pl. II*: 76. 1818. *L. caule erecto brachiato, foliis ovato-lanceolatis obsolete*

incisis, capsulis inflatis, Linnaeus, Hort. Cliff. 500. 1737. This plant was sent to Linnaeus by Gronovius, who had it from Clayton in Virginia; Linnaeus remarks on its similarity to *L. Cliffortiana*, but makes it a distinct species.—Stem erect, usually with many racemose axillary branches in age, sometimes becoming sub-corymbiform through elongation of the lower branches, 15–100 cm. high (ave. 30–60). (In sterile soil dwarf plants 10–20 cm. high are often seen; usually unbranched, bearing a few flowers and apparently maturing seed). Lower part of the stem usually purplish (sometimes green),



FIG. 20. Range of LOBELIA INFLATA.

upper part light green. Whole plant loosely long-hirsute (rarely nearly smooth), or the upper stem and upper sides of the leaves smooth or strigose. Hairs flat, chaffy, most numerous near the angles formed on the stem by the decurrent leaf-bases. Cauline leaves 10–25, obtuse and obovate or broad-ovate below; above ovate-oblong or ovate-lanceolate, short-acute; sessile or sub-petiolate below; irregularly rough-serrate or dentate; usually $1.5\text{--}2.5 \times 4.5\text{--}8.0$ cm. (sometimes larger). Upper leaves often passing gradually into the broad-leafy lower flower-bracts. Inflorescence consisting of loose racemes at the ends of the branches, the central one the largest, to 30 cm. long (usually 10–15 cm.), not secund, bearing 1–30 flowers upon slender, more or less erect, finely prickly-puberulent pedicels (5–10 mm. long

in fruit), each with a pair of inconspicuous bracteoles at the base. Flower-bracts leafy-ovate below, lanceolate or linear above, little longer than the pedicel, finely callose-denticulate, smooth or ciliate. Calyx in anthesis campanulate, smooth, becoming much inflated in fruit, oval to sub-globose, 3.5–8.0 × 7.0–11.5 mm. Capsule inferior. Calyx-lobes subulate or linear, 3.5–5.0 (8.0) mm. long, smooth or rarely slightly ciliate; auricles none. Flower inconspicuous, 8–10 mm. long, including calyx. (In this species the corolla is quite short in proportion to the calyx, being only about 7 mm. long.) Corolla violet-blue to nearly white, sometimes with a suggestion of pink which shows plainly in dried material; base of the lower lip pubescent; corolla otherwise smooth. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip oblong, shorter than the tube; the two upper lanceolate. Filament-tube 2.5–3.0 mm. long, slightly pubescent below, united $\frac{2}{3}$ of its length above. Anther-tube 1.5–1.7 mm. long, bluish-gray, the two smaller anthers tufted at the tip, the three larger merely pubescent on the backs. Annual.

This species is readily identified in flower by the campanulate calyx, rather long calyx-lobes, and the short corolla, which seems even shorter in proportion to the large calyx. Flowering specimens are sometimes mistaken for *L. spicata*, as the branches often do not develop until fruit has appeared on the main axis. Fruit matures quickly, so that a single plant is in flower during a long period and still has only a few flowers open at a time, instead of the long flower spike of *L. spicata*.—Dry woods, fields, roadsides and waste places; an aggressive, weedy species. Prince Edward Island to Hudson Bay (Hooker, Fl. Bor. Am.) and Saskatchewan (Hooker, l. c.), south to Georgia; west to the Mississippi Valley (Nebraska, acc. to Petersen). Original habitat probably dry, rather open woods; now spreading rapidly to old fields. Rare or absent on the Coastal Plain. Flower beginning about July 1; flower and fruit through the summer. The species is so readily identified that the specimens examined are not cited.

11. *L. CANBYI* Gray, Man. Bot. Ed. 5.: 284. 1867. TYPE LOCALITY: "pine barrens of New Jersey, especially at Quaker Bridge . . . (also South Carolina)." TYPE SPECIMEN: Material collected by W. M. Canby and by C. E. Smith at Quaker Bridge, as well as M. A. Curtis's collections from South Carolina, seen in the Gray Herbarium.—*L. Nuttallii*, in part, of early American authors.—Stem erect, tall and slender, unbranched or with few—several short racemose branches (sometimes much racemosely branched), 30–100 cm. high (ave. 60–70 cm.), smooth or sparsely pubescent and reddish below, becoming smooth and deep green above, leafy. Leaves cauline, 20–40, linear or narrowly lanceolate, 0.05–0.4 × 0.9–5.0 cm., often closely appressed, giving the plant a very slender appearance; rather thin, nearly smooth, obscurely callose-denticulate, but sub-entire in outline; the upper often merging gradually into the bracts of the raceme. Roots fibrous;

annual, acc. to Canby, in a letter to Dr. Britton, now in the N. Y. Botanical Garden. Inflorescence a loose terminal raceme 10–30 cm. long, never prominently secund, (10) 15–20 (30)-flowered. Branches, if present, bearing 2–10 flowers each, rarely as many as the central raceme. Pedicels somewhat angular, 7–11 mm. long in fruit, more or less upright, usually distinctly upwardly barbed-ciliate, each with a pair of inconspicuous bracteoles near the base. Flower-bracts linear, about as long as the pedicels, or longer, to 10–20 mm.; smooth or ciliate, callose-denticulate. Calyx in anthesis long-campanulate, rough-puberulent, becoming oval or oblong-oval in fruit, 2.5–4.0 × 4.0–7.0 mm. Capsule more or less upright, about $\frac{3}{4}$ inferior. Calyx-

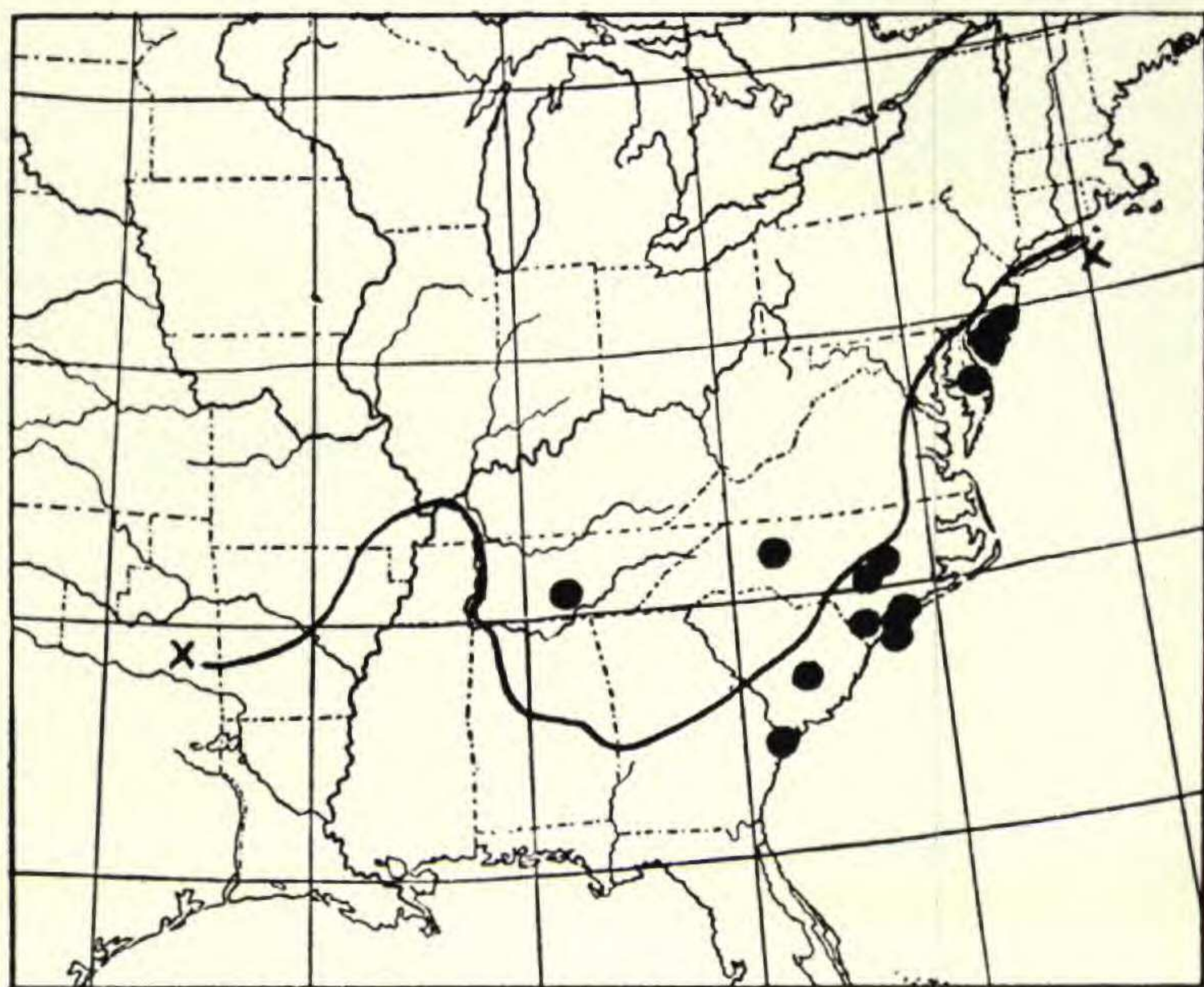


FIG. 21. Range of *LOBELIA CANBYI*.

lobes narrowly lance-linear, acute, 2.5–6.0 mm. long, obscurely callose-denticulate, smooth or somewhat ciliate. Auricles none. Flower 9–14 mm. long, including calyx (ave. 11–12 mm.). Corolla blue, smooth, except for the pubescent base of the lower lip. Corolla-tube entire except for the dorsal fissure; lobes of the lower lip ovate, slightly shorter than the tube; two upper lobes lanceolate, about the same length. Filament-tube about 3.5 mm. long (3–4 mm.), nearly smooth, connate more than half its length above. Anther-tube 1.9–2.1 mm. long, light bluish-gray, the two smaller anthers tufted, the three larger nearly smooth or pubescent on the backs.—Open grassy or sandy swamps, or pineland swamps; Tennessee and Georgia to the Pine Barrens of New Jersey; Appalachian Provinces or Coastal Plain, but in its north-eastern extension confined to the Pine Barrens. Flower August–September (sometimes in July). Representative material seen: TENNESSEE: COFFEE: Tullahoma, *Svenson 4245* (ANS).

GEORGIA: CHATHAM: "Savanna, Aug. 17, 1908" (NC). SOUTH CAROLINA: ORANGEBURG: Eutawville, *Eggleston 5000* (CM, M, NB, US). NORTH CAROLINA: BRUNSWICK: Southport, *Oosting 33705* (Duke). COLUMBUS: Whiteville, *Schallert* (Duke); HARNETT: Erwin, *Oosting 33613a* (Duke). IREDELL: Statesville, *Hyams* (M). JOHNSTON: Clayton, *Blomquist 5026* (Duke). NEW HANOVER: Wilmington, *McCarthy*, ann. 1885 (US). PENDER: Burgaw, *Hyams*, Aug. 1879 (US). DELAWARE: SUSSEX: Ellendale, *Canby* (ANS, NB, US). NEW JERSEY: ATLANTIC: Mays Landing, *Pennell 8113* (ANS). BURLINGTON: Speedwell, *Stone 7440* (ANS). CAMDEN: Cedar Brook, *MacElwee*, Aug. 1893 (ANS). CAPE MAY: Belle Plain, *Stone 3484* (ANS). OCEAN: Lakehurst, *Long*, Aug. 1908 (ANS).

12. *L. BOYKINII* Torrey & Gray, A.DC. Prodr. Syst. Veg. VII:

374. 1839. TYPE LO-

CALITY: "in paludibus Georgiae (Boykin) et Floridae (Chapman)."

TYPE SPECIMEN: authentic material, collected by Boykin, in the Torrey herbarium in the New York Botanical Garden. Aquatic, the lower stem immersed. Stem erect, slender, simple or with spreading racemose branches above, smooth, green, fistulose, 50-85 cm. high. Leaves cauline, filiform, smooth, 0.52-2.5 cm. long, few-50 or more, often deciduous,

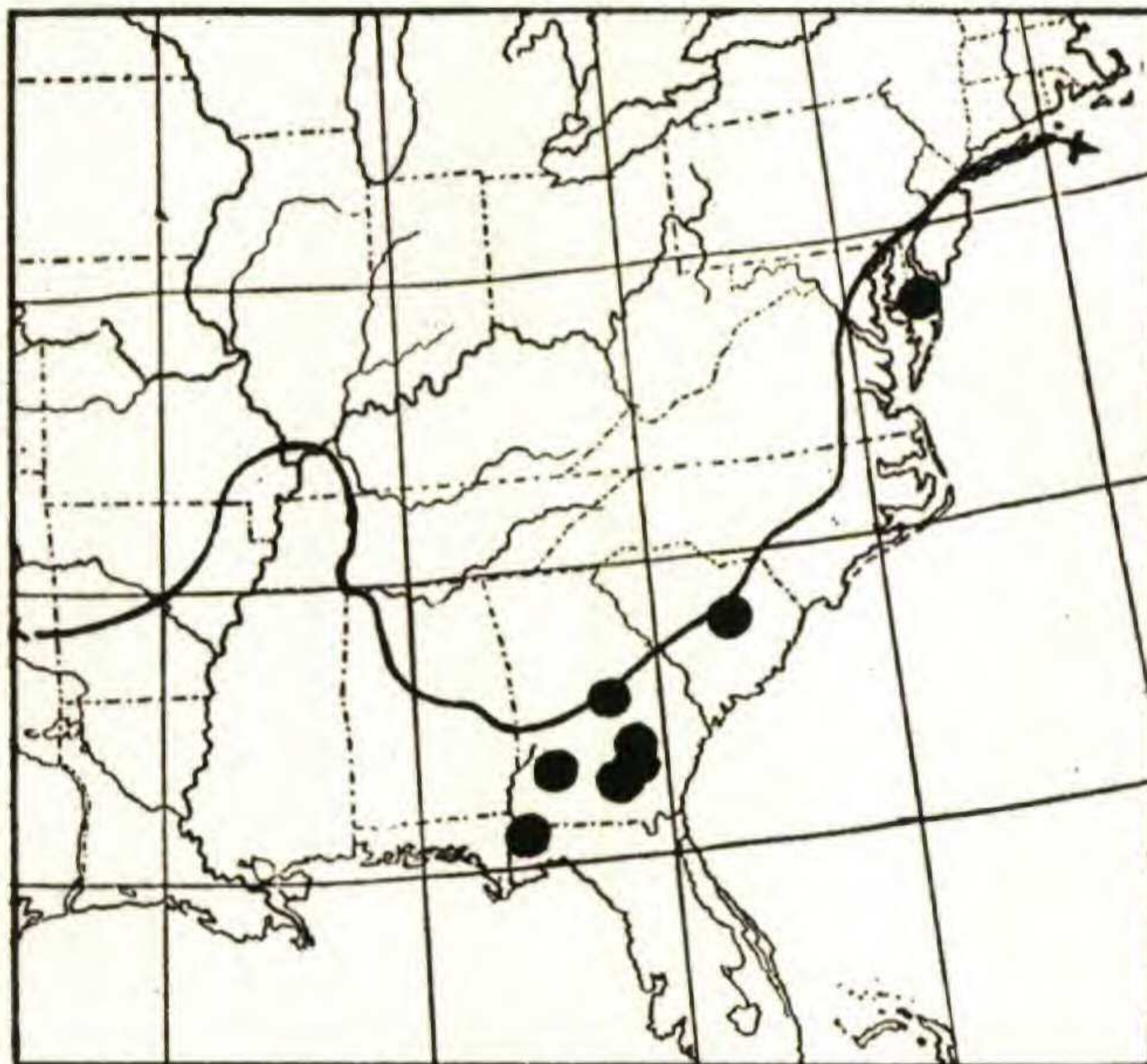


FIG. 22. Range of *LOBELIA BOYKINII*.

entire or obscurely callose-denticulate, the upper merging gradually into the bracts of the inflorescence. Spreading by thick creeping rootstocks. Inflorescence a lax terminal raceme, more or less secund, 7-20 cm. long, bearing 10-25 loosely spreading flowers upon slender smooth pedicels 6-17 mm. long (ave. 10-11 mm.). Bracteoles of pedicel none. Flower-bracts smooth, filiform, much shorter than the pedicels, 2-8 mm. long. Calyx in anthesis very small, round, or appearing flattish because of the spreading calyx-lobes; smooth, becoming hemispheric in fruit, about 3.0 mm. in diameter. Capsule about half inferior, somewhat longer than broad. Calyx-lobes spreading, filiform, 3.0-4.5 mm. long, entire, smooth. Auricles none. Flower 10-13 mm. long, including calyx. Corolla blue, with a white eye, smooth, or ciliate inside, the lower lip smooth or ciliate. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip oblong, short-acute, shorter than the

tube; two upper lobes long-linear, nearly as long as the tube or shorter, erect. Filament-tube 3.5–5.0 mm. long, smooth, connate above about $\frac{2}{3}$ of its length; deflexed. Anther-tube 1.5–1.8 mm. long, bluish-gray, the two smaller anthers sparsely white-tufted at the tips, the three larger pubescent on the backs.—Pineland swamps or cypress ponds, often partially immersed; northern Florida, Georgia, South Carolina, southern Delaware; Coastal Plain. Flower May 1–June 15. Representative material seen: FLORIDA: GADSDEN: Quincy, *Chapman* (NB). GEORGIA: BALDWIN: Milledgeville, *Boykin* (ANS, NB). BERRIEN: Alapaha, *Curtiss 6819* (Del, M, NB). COFFEE: Douglas, *Harper 2199* (NB, US). LEE: Leesburg, *Earle* (Tracy 9118) (NB). TELFAIR: Lumber City, *Biltmore herb. 4167a* (M, US). SOUTH CAROLINA: SUMTER: Cane Savanna, *Stone 420* (ANS). DELAWARE: SUSSEX: Ellendale, *Long and Bartram 1636* (ANS).

13. *L. APPENDICULATA* A. DeCandolle, Prodr. Syst. Veg. VII: 376. 1839. TYPE LOCALITY: "Texas." TYPE SPECIMEN: collected by Drummond; seen by DeCandolle in Bentham's herbarium. Specimens collected by Drummond in Texas, now in the Gray Herbarium, are from Hooker, and are probably authentic.—In appearance and vegetative characters not to be distinguished from *L. Gattingeri* Gray except for the larger size (25–90 cm. high; ave. about 50 cm.); more numerous and larger leaves (4–15 in number, ave. 8–9); size 1–3 × 2–7 cm. Inflorescence a terminal raceme, usually distinctly secund, about 20–30 cm. long, bearing 15–70 (ave. about 30) flowers, upon short curved pedicels (4–11 mm. long in fruit), which are rough-puberulent, each with a pair of inconspicuous bracteoles near the base. Flower-bracts ciliate or nearly smooth, callose-denticulate, linear or narrowly lanceolate, 4–10 (18) mm. long. Calyx in anthesis short-campanulate or flatter, nearly smooth or puberulent, becoming long-campanulate in fruit, with a smooth inflated appearance, 4–6 mm. in diameter. Capsule $\frac{2}{3}$ – $\frac{3}{4}$ or more inferior, horizontal or somewhat pendent at maturity. Calyx-lobes narrowly lance-linear, 4–8 mm. long (ave. about 5.0 mm.), densely bristly-ciliate (sometimes only near the tip); auricles conspicuous (rarely small or lacking), lanceolate-acute or broad-foliaceous, 1–3 mm. long, often white-scarious tipped; often connate; usually bristly-ciliate on the margins. Flower 10–15 mm. long (ave. 12 mm.), including calyx. Corolla light violet-blue or lilac, smooth outside, pubescent inside at the base of the lower lip. Corolla-tube entire, except for the dorsal fissure; lobes of the lower lip broad-ovate, about as long as the tube; two upper lobes shorter, lanceolate. Filament-tube 3–4 mm. long, pubescent below, connate about half its length above, somewhat deflexed. Anther-tube about 2.0 mm. long, bluish-gray, the two smaller anthers tufted at the tips, the three larger pubescent on the backs.

This plant cannot surely be separated, except by geographical range, from *L. Gattingeri* Gray. Apparent differences disappear when various series of measurements are averaged; *L. appendiculata* is a

more widely distributed plant, and consequently has a greater chance to produce extremes, which makes it seem larger on the whole. The ciliation of the calyx in *L. appendiculata* is very variable, as is the length of the auricles, and plants are found which are almost identical with *L. Gattingeri*. However, due to the very restricted range of the latter, and the fact that relatively few intermediate plants have been seen, it seems best for the present to maintain both as good species.

Usually in low sandy soils; prairies, open woods or pinelands, sometimes in dry situations; southeastern Texas to central Alabama, north to Oklahoma, northwestern Arkansas and eastern Kansas; doubtfully Illinois and Missouri. Flower April–June; earlier in the southern part of its range than in the northern. Representative material seen:

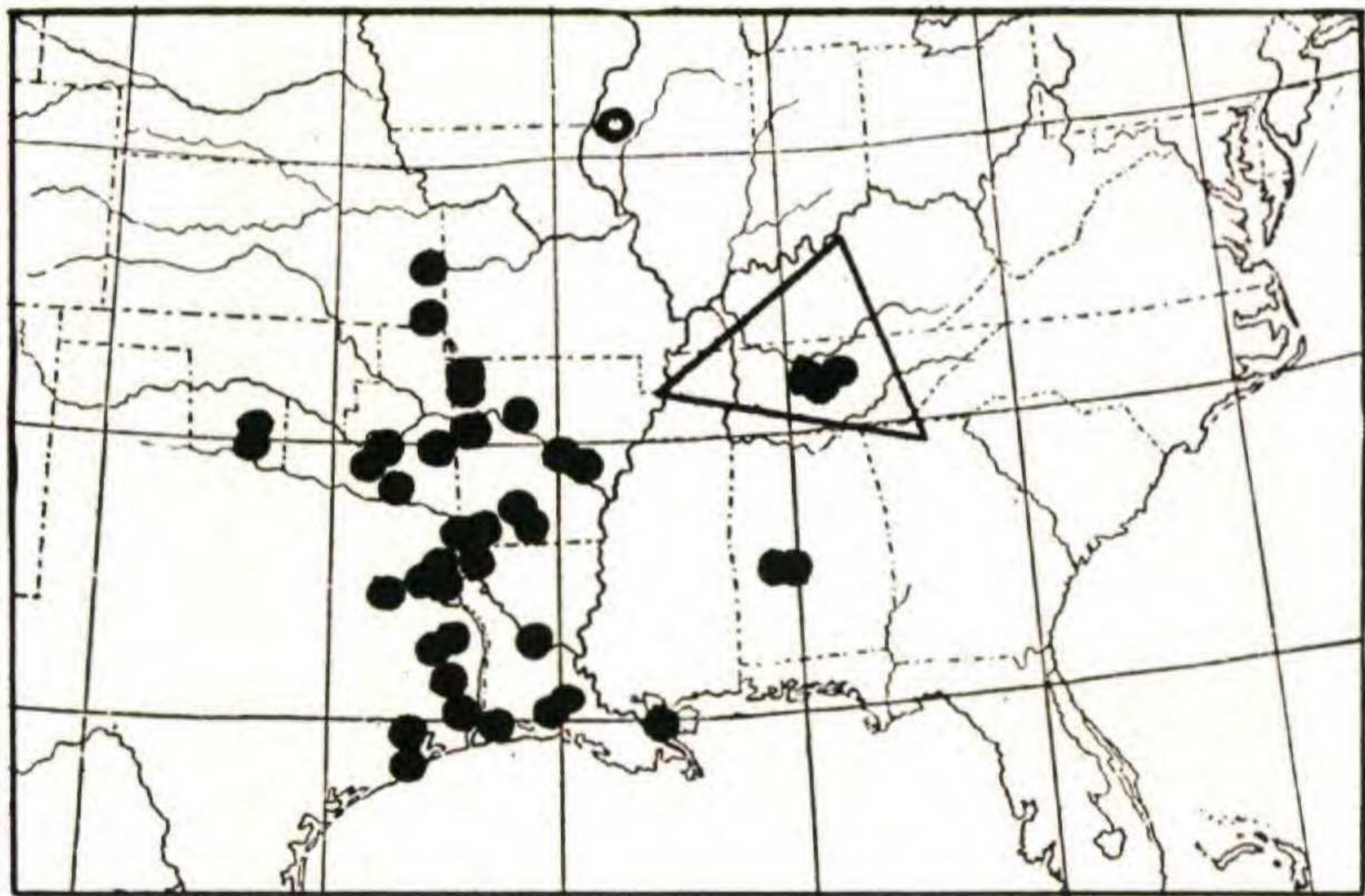


FIG. 23. Range of LOBELIA APPENDICULATA and (insert) of *L. GATTINGERI*.

ALABAMA: DALLAS: Marion Jct., *Mohr*, May 1893 (ANS). PERRY: Uniontown, *Mohr*, Jun. 1890 (Mo). LOUISIANA: ACADIA: Crowley, *Pennell 10203* (UP). CADDO: Rhodessa, *Palmer 27157* (Mo). CALCASIEU: Perkins, *Pennell 10214* (ANS); "Calcasieux," *Langlois*, Apr. 1884 (NYS). ORLEANS: New Orleans, *Dr. Ingalls* (NB). RAPIDES: Pineville, *Palmer 7585* (Mo, NB); Alexandria, *Ball 518* (G, Mo, NB, US). ST. LANDRY: Opelousas, *Langlois*, Apr. 1880 (M); May 1885 (UP). TEXAS: *Drummond* (G, NB); ANGELINA: Lufkin, *Biltmore herb. 8216b* (US). BOWIE: *Eggert*, Jun. 1898 (NB). CASS: Hughes Springs, *Biltmore herb. 8216a, 8216d* (US). GALVESTON: Kemah, *Fisher 378* (US). HARDIN: Fletcher, *Palmer 9574* (Mo). HARRIS: Houston, *Lindheimer*, Apr. 1842 (Mo); *Small 11812* (NB). HARRISON: Marshall, *Palmer 7920A* (Mo). SAN AUGUSTINE: San Augustine, *Palmer 9517* (Mo). TYLER: Rockland, *Neally 46* (Del, US). UPSHUR: Big Sandy, *Reverchon 2056* (Mo). VAN ZANDT: Silver Lake, *Reverchon 2085* (Mo). OKLAHOMA: ATOKA: Limestone Gap, *Butler*, May 1877 (ANS, Mo, US); Atoka, *Sheldon 57* (CU). CADDO: